DOES NOT CIRCULATE

UNIVERSITY OF MICHIGAN
MAY 17 1954
MEDICAL LIBRARY

BRITISH MEDICAL JOURNAL

JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY MAY 1 1954

TABLE OF CONTENTS

A Milestone in Medical History J. ARTHUR MOODY, M.B., B.Ch., B.A.O. 997

An Outbreak of Trichinosis in Liverpool in 1953 ANDREW B. SEMPLE, M.D., D.P.H., J. B. MEREDITH DAVIES, M.D., D.P.H., W. E. KERSHAW, M.D., D.T.M.&H., and C. A. ST. HILL, M.B. 1002

Biomechanical Problems of the Original Judet Prosthesis JOHN T. SCALES, M.R.C.S., L.R.C.P., and J. M. ZAREK, Ph.D., B.SC., A.M.I.Mech.E. 1007

Heparin and Ethyl Biscoumacetate in Prevention of Experimental Venous Thrombosis PAMELA JEWELL, M.B., THOMAS PILKINGTON, M.D., M.R.C.P., and BRIAN ROBINSON, M.B., M.R.C.P. 1013

The Number of Melanocytes in Human Epidermis G. SZABÓ, M.SC. 1016

Congenital Syphilis Diagnosed by Bone Changes K. L. MARKS, M.Ch.Orth., F.R.C.S.Ed. 1018

Tabetic Charcot's Spine DOUGLAS J. CAMPBELL, F.R.C.P.Ed., and J. OLIVER DOYLE, M.D., M.R.C.P.I. 1018

Vitamin K_1 in Anticoagulant Therapy M. TOOHEY, M.D., M.R.C.P. 1020

MEDICAL MEMORANDUM

Orthograde and Retrograde Intussusception. F. C. MADDOX, M.B. 1022

BOOK REVIEWS 1023

CLINICAL PATHOLOGY

Tropical Diseases in Britain. A. W. WOODRUFF, M.D., Ph.D., F.R.C.P., D.T.M.&H. 1030

GENERAL ARTICLES AND NEWS

MEDICAL ART 1033
THE CHANGING AND THE UNCHANGING FACE OF MEDICINE 1033
PREPARATIONS AND APPLIANCES 1034
MEDICO-LEGAL 1045
VITAL STATISTICS 1046
MEDICAL NEWS 1047
BIRTHS, MARRIAGES, AND DEATHS 1049
QUESTIONS AND COMMENTS 1049

OBITUARY

Colin D. Lindsay, M.D. 1042
H. T. Evans, D.M., M.R.C.P. 1042
Thomas Carnwath, D.S.O., D.SC., M.B., D.P.H. 1043
W. V. Tothill, L.M.S.S.A. 1043
M. Ll. Jones, F.R.C.S. 1043
H. P. Jameson, M.D., M.R.C.P. 1044
H. G. Carlisle, M.D. 1044
W. C. D. Bewick, M.B. 1045
H. Lincoln Hatch, M.B., D.P.H. 1045

LEADING ARTICLES

Trichinosis 1025
The Small-list Practitioner 1026

ANNOTATIONS

Haemoglobin C 1027
Melanocytes and Melanomas 1028
Primidone in Epilepsy 1028
Twenty-five Years of Opium Control .. 1029

CORRESPONDENCE

Skin Response in Asthma. J. PEPYS, M.R.C.P. 1035
Drinking Sea-water. T. C. MACDONALD, M.D. 1035
Chlorpromazine and Promethazine. D. RECKLESS, M.B., D.A.; D. A. B. HOPKIN, M.D., D.A. 1035
Prostatic Obstruction Due to Ephedrine. H. CARTWRIGHT, M.B.; W. FINE, M.D. 1036

SUPPLEMENT

Full Contents on First Page of Supplement

The City of Glasgow. ARCHD. L. GOODALL, M.D., F.R.C.S.Ed., F.R.F.P.S., D.P.H. 199
Occupational Health 201
G.M.S. Committee Supplementary Report 204
Correspondence:
Remuneration of Hospital Medical Staff. C. J. S. HOLDSWORTH, M.R.C.S.; B. SUGDEN, M.B.; O. C. CARTER, M.B.; RANDLE LUNT, M.Ch.Orth.; A. A. REID, M.B. 212

CORRESPONDENCE—*cont.*

"New Cure for Gastric Ulcer." H. DAM, D.SC. 1036
E.C.T. in Elderly Psychotics. F. HOUSTON, M.R.C.S. 1036
Entropion. C. W. C. ROBINSON, L.R.C.P.I. 1037
Pregnancy Following Haematosalpinx. J. R. E. JAMES, F.R.C.S.Ed. 1037
Domiciliary Obstetrics. C. J. DEWHURST, M.B.; D. S. GREIG, M.D.; P. WINTERSGILL, M.R.C.S. 1037
Nocturnal Enuresis and Frequency. R. E. A. S. HANSEN, M.B. 1038
Retention of Urine. T. L. CHAPMAN, F.R.C.S. 1039
Strangulated Hernia. J. RENDLE-SHORT, M.R.C.P., and C. HAVARD, F.R.C.S. .. 1039
Orchidectomy. C. J. CELLAN-JONES, F.R.C.S.Ed. 1039
False Positive Jelly Test. P. D. MULKERN, M.R.C.S. 1039
Cortisone and Carcinogenesis. N. LASS, M.D. 1039
Distension Pressure in Rebreathing Bags. J. G. ROBSON, M.B., D.A. 1040
Change of Sex. C. ALLEN, M.D. 1040
"Edwardian" Adolescents. MARGARET LOWENFELD, M.R.C.S. 1040
Depression Treated by E.C.T. HARVEY BAIRD, M.D. 1041
Induced Hypotension. FLORENCE FAULKNER, F.F.A. R.C.S. 1041
The Gold Coast. M. J. COLBOURNE, M.B. 1041
Clergy and Doctors. F. GRAY, M.B. .. 1041
London Medical Orchestra. R. P. ROSS, M.B. 1041

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.1

No. 4869, WEEKLY, PRICE 3/-

Copyright

REGISTERED AS A NEWSPAPER

SAUNDERS BOOKS

Conant

MANUAL OF CLINICAL MYCOLOGY

By NORMAN F. CONANT, Ph.D., and Associates at Duke University School of Medicine. 456 pages, with 202 figures.

Superbly suited for use in teaching mycology to medical students. This second edition gives a concise explanation of the diagnosis and treatment of all diseases of fungus origin.

New (2nd) Edition. 52s. 6d.

Mackie, Hunter, and Worth

MANUAL OF TROPICAL MEDICINE

By Colonel THOMAS T. MACKIE and Associates. 907 pages, 304 illustrations (7 in colours).

Current interest in tropical medicine made this revision extremely important. Basic material of a textbook of parasitology is combined with the clinical management, control and prevention of tropical diseases.

New (2nd) Edition. 60s.

Sweet

THORACIC SURGERY

By RICHARD H. SWEET, M.D., *Clinical Professor of Surgery, Harvard Medical School.* 381 pages with 159 illustrations.

More than 100 procedures (including operations on the heart and great vessels) are described, all from the point of view of application of principles of general surgery to the special conditions found within the thorax.

New (2nd) Edition. 50s.

Boies

FUNDAMENTALS OF OTOLARYNGOLOGY

By LAWRENCE R. BOIES, M.D., *Professor of Otolaryngology, University of Minnesota.* 487 pages, 197 figures.

An elementary textbook designed to offer basic facts about diseases of the ear, nose, and throat. All new methods and new drugs, including recently developed antibiotics, are evaluated.

New (2nd) Edition. 35s.

Child

HEPATIC CIRCULATION AND PORTAL HYPERTENSION

By CHARLES G. CHILD, M.D., *Professor of Surgery, Tufts Medical College.* 444 pages. 132 figures. 60s.

Of great interest to those interested in the physiology, both normal and abnormal, of this unique circulatory system; and to physicians and surgeons treating patients with hepatic disease and related disorders.

Parsons & Ulfelder

ATLAS OF PELVIC OPERATIONS

By LANGDON PARSONS, M.D., *Professor of Gynecology, Boston University*; and HOWARD ULFELDER, M.D., *Professor of Gynecology, Harvard Medical School.* 231 pages and 220 plates. 90s.

A working manual—illustrated in meticulous detail.

(The prices quoted are special prices which apply only to United Kingdom and Eire.)

W. B. SAUNDERS COMPANY LTD. **7, Grape Street, LONDON, W.C.2**

ZŌPLA

MEDICAL AND SURGICAL PLASTERS

Developed in collaboration with some of the leading hospitals, the ZOPLA range of self-adhesive, zinc oxide plasters covers every medical, surgical, and dermatological need.

The range includes:

STRAPPINGS—for surgical use. Powerfully adhesive, on white, flesh, and elastic cloths.

FELTS of selected Merino Wool, for all padding and protective purposes. Only pure wool felt will retain its resilience and will not harden in use.

HELVIA—First Aid Flexible Dressing—elastic adhesive plaster with medicated gauze.

ZOPLA-BANDS—Elastic adhesive bandage of superior quality.

Details of the full ZOPLA range, together with samples, will gladly be sent on request.

LESLIES LIMITED
ESTABLISHED 1823
Walthamstow, London, E.17

Corrective Efficiency and Absolute Comfort

SALT'S SACRO-ILIAC BELT

The adoption of Salt's Sacro-iliac Belt affords quick relief of pain and discomfort, together with a rapid restoration of the sacral and iliac bones. A beneficial effect is also exerted on the tone of the abdominal viscera. This efficiency is joined with real comfort, so that the patient can make an early resumption of normal activities. Styles are available for both sexes. Further details and Measure/Order forms are obtainable on request.

LONDON APPOINTMENTS:
1 *Stanley House,*
103 *Marylebone High Street,*
London, W.1.
'Phone: WELbeck 3034.

SALT & SON LTD.
CHERRY STREET · BIRMINGHAM 2 · MID. 5455

BRITISH MEDICAL JOURNAL

LONDON SATURDAY MAY 1 1954

A MILESTONE IN MEDICAL HISTORY*

THE CENTENARY OF THE METROPOLITAN COUNTIES BRANCH

BY

J. ARTHUR MOODY, M.B., B.Ch., B.A.O.

Twenty years previous to the foundation of this Branch the Provincial Medical and Surgical Association had just been formed, and the medical profession had undergone in that time great and striking changes in its social and educational aspects and in its general tone, the well-informed practitioner tending to displace the apothecary, and the level in the standard of treatment in all fields already becoming more expert. The year 1853 was a milestone in the history of our Association (then known as the Provincial Medical and Surgical Association), not only for the newly founded Metropolitan Counties Branch. The Association's journal—till then known as the *Provincial Medical and Surgical Journal*—had up to this date been edited in Worcester and published in London, and by a decision of the Annual Meeting at Oxford in 1852 it was in future to be edited as well as published weekly in London with its better literary and scientific facilities. Furthermore, it was to have a new editor.

One cannot read the *Journal* of the period (1853–6)—then named the *Association Medical Journal*—without sensing in most of the controversies of the time a considerable gulf between the London doctors and those in the provinces. Membership of the Provincial Medical and Surgical Association did not involve attachment to any particular local unit of the Association; indeed, membership was on a rather scattered geographical basis, and it was later found necessary to establish some kind of local unit. This local unit, one of the first steps in our organization, appears to have been the Branch. The Metropolitan Counties Branch, then, started its career on November 26, 1852, as a District Branch (as it was called) of the Provincial Medical and Surgical Association, consisting of members of that Association resident in Middlesex and "such parts of Essex, Kent, Surrey, and the adjoining counties as are not included in any existing Branch."

Notable Original Members

Who were some of the original members? The *Journal* of December 8, 1852, gives an account of the first meeting of the Metropolitan Counties Branch, with a list of some of the members present. Many of them became famous, and I trust that my somewhat modest research into the paths they took may be of interest.

Sir John Forbes

In the chair was Dr. Forbes, later to become Sir John Forbes. He was a schoolfellow and lifelong friend of Sir James Clark, Physician to Queen Victoria, and was himself appointed to the Queen's Household in 1840. After obtaining a diploma in surgery at Edinburgh he entered the Navy in 1807 as assistant surgeon, and on discharge in 1816 he returned to Edinburgh, graduating M.D. in 1817. Not only was he a popular and very successful physician, first at Penzance and later in Chichester, where he appears to have succeeded men who, like himself, later moved to London, but in his early days he was the author of papers on meteorological and geological subjects. In 1827, while at Chichester, he was mainly instrumental in founding the Infirmary, which was the first general hospital established in the county.

Forbes appears to have combined very successful practice at Chichester with much literary activity. For instance, he translated and published Laennec's work on the stethoscope, which went to a fifth edition. His chief credit here, however, is that he was in advance of most of the physicians of the day, who appear to have treated Laennec's great discovery with contempt and ridicule. Although Forbes was certain that the stethoscope would be acknowledged to be one of the greatest discoveries in medicine he does express some doubt whether it would come into universal use. He followed up this translation with another (1824) on the same subject—Auenbrugger's remarkable work on percussion—and he added to the translation an account of his own with the title "Original Cases Illustrating the Use of the Stethoscope and Percussion in the Diagnosis of Diseases of the Chest."

He next undertook with John Conolly—his professional rival in Chichester—the *Cyclopaedia of Practical Medicine*. The most eminent physicians of the day contributed to it; the same applies to a periodical known as the *British and Foreign Medical Review*, a quarterly journal, in which he was also associated with Dr. Conolly. This quarterly review was a great event, not only in Forbes's life, but also in medical literature. It soon became the leading medical journal in the country—its reputation extended not only all over Europe but also to America, where it was reprinted. Chiefly with the object of improving the *Review*, Forbes moved to London in 1840—a move which must have involved him in considerable pecuniary loss, for he could never expect at the age of 53 (even though through the influence of his friend Sir James Clark he was appointed to the Queen's Household) to pick up a London practice equal to that which he enjoyed at Chichester. After 12 years the circulation of the *Review* began to fall off and he had to terminate the

* The Presidential Address delivered at the Annual Meeting of the Metropolitan Counties Branch of the British Medical Association on June 9, 1953.

publication, which, although it had been self-supporting for eight years, had cost him £500 in the undertaking. An article on homoeopathy in which he appeared to be too fair to the homoeopathists gave considerable offence to the profession, and may have had something to do with its discontinuance. The *Review* was amalgamated with a rival which enjoyed an even larger circulation—Johnson's *Medico-Chirurgical Review*—under a new title, the *British and Foreign Medico-Chirurgical Review*, and continued on similar lines until 1877.

Forbes became F.R.C.P. and Hon.D.C.L. Oxford, and in 1853 was knighted. He was a member of various learned and scientific societies, both in Europe and in America. He gave some attention to the question of mesmerism, and wrote an amusing account of his detection of certain impostors in this particular field. Towards the end he devoted himself, in London, chiefly to benevolent and literary work, and to travel on the Continent, publishing accounts of his visits to Germany and Switzerland. He died in 1861 at Whitchurch, near Reading, in the house of his only son, and through all his life was loved and honoured. Few men of the nineteenth century have done more to promote the cause of sound medical literature than this Founder-President of our Branch: the Branch was most fortunate in starting its career under a President of such distinction and versatility—literary and medical.

John Rose Cormack

Probably the next personality of interest present at the first meeting was Dr. John Rose Cormack. A Scot, like Forbes, and a son of the manse, he resembled Forbes in his literary ability. His great distinction, so far as our Association is concerned, is of course that he became editor of the *Journal* in 1853. With his M.D. Edinburgh in 1837 he received the gold medal for his thesis on the presence of air in the organs of circulation. After studying in Paris he started practice in Edinburgh, was appointed Physician to the Royal Infirmary and the Fever Hospital, and greatly enhanced his early reputation by a paper on the relapsing fever epidemic in 1843. He resigned his appointment at the Royal Infirmary on being refused permission to give clinical lectures, and in 1847 removed to London. By this time he had had much experience in medical journalism, for in 1841 he had established the *Edinburgh Monthly Journal of Medical Science*, known and referred to as *Cormack's Journal*, and later the *Edinburgh Medical Journal*. Incidentally, he had been President of the Edinburgh Royal Medical Society in the year of its centenary festival.

On arriving in London Cormack settled in practice at Putney, and soon started another monthly periodical—the *London Journal of Medicine*. As with Forbes's periodicals, so with Cormack's—the names of most of the physicians and surgeons of distinction at that time in London appear on the list of contributors. That journal ceased to appear when the *Association Medical Journal* began. He remained editor of the latter until 1855, and a perusal of the leading articles of the period manifests a high standard of literary style and expression. Ill-health compelled him to settle in Orleans in 1866, and in 1869 he removed to Paris, graduated M.D. Paris, and became Physician to the British Embassy. Cormack's fame and his knighthood in 1872 (also Legion of Honour in 1871) were the reward for his devoted services to the distressed foreigners and to the sick and wounded during the siege of Paris. An unselfish, public-spirited man, he died poor in 1882, and his family had to be helped by subscription among his former colleagues. He seems to have been a man of great industry and fine character, highly respected by the British colony in Paris. He was the first editor of the Association's *Journal* to have a name and reputation outside its ranks. He had been appointed physician to the Hertford British Hospital in Paris, established by Sir Richard Wallace, who incidentally provided the medical education for Cormack's only surviving son. His publications, apart from his editorial work, included a collection of clinical studies on cholera, diphtheria, paralysis, and a translation of four volumes of Trousseau's *Clinical Lectures*. (Trousseau was the first to aspirate the pleural cavity, and actually invented an aspirator.)

Daniel Hack Tuke

The third notable figure who deserves mention is Daniel Hack Tuke (1827–95). He came from a family of Quaker philanthropists—his grandfather and his great-grandfather were closely associated with the designing of the York Retreat for the Insane, and he himself became famous as a mental specialist. Before contemplating the study of medicine he appears to have entered the service of the York Retreat, and not only to have studied the literature of insanity but in his spare time to have made some informal study of the patients. At Bart's, as a student, he distinguished himself by gaining several prizes, and in 1853 obtained the M.D. Heidelberg. His career was sadly interrupted for 15 years by pulmonary tuberculosis, which necessitated his retirement as physician to the York Retreat and Infirmary; but in 1875, when his health permitted his re-entry into practice, he settled in London as a consulting mental specialist, becoming a governor of Bethlem Royal Hospital, and a lecturer and examiner in mental disease at Charing Cross Hospital. He was one of the founders of the After Care Association (an association which takes charge of the poorer class of convalescents from insanity). He wrote and published extensively on mental illness, and his *Manual of Psychological Medicine* kept its place for many years as a standard treatise. In 1880 he, like Forbes and Cormack, also became an editor—joint editor of the *Journal of Mental Science*. He was President of the Medico-Psychological Association in 1881, and Glasgow University conferred on him its LL.D. in 1883. He appears to have been encyclopaedic in his knowledge of lunacy and prolific in his writing, and to him and his family must go a great deal of credit for the humanizing of the treatment of the mental patient in asylums.

John Conolly (1794–1866)

John Conolly graduated at Edinburgh in 1821, and devoted himself from the start to the study of insanity. He began practice in Chichester, where Dr. (afterwards Sir John) Forbes was already in practice, and the young men at once formed a strong and lasting friendship. They were, however, rivals, and together they concluded that the "district" did not afford sufficient employment for both, and in a year's time Conolly moved to Stratford-on-Avon. He remained there about five years, but does not appear to have been very successful so far as the general practice of his profession was concerned. Like Forbes and Cormack, he was much attracted by literary work, and edited (with Dr. James Copland) the *London Medical Repository*—a large part of their endeavour being to call attention to the numerous medical books then appearing in France and Germany. While at Stratford Conolly took a prominent part in public affairs, and was twice mayor of the town. He interested himself in every matter for the public good and was enthusiastic for sanitation and public health.

In 1827 Conolly moved to London, and in the following year was appointed Professor of the Practice of Medicine at University College, London. While he held that chair he published his work on *Indications of Insanity*, but failed in his endeavour to introduce at London University systematic clinical instruction into the curriculum. In London he was the friend of influential men like Lord Brougham and Lord John Russell, but in spite of these friendships he seems to have failed in London as a physician; nor does he appear to have filled the professorial chair with any great ability.

In 1830 he left London and returned to Warwick, there resuming his post of inspecting physician to the asylums in

Warwickshire. He continued to write a good deal, and assisted his old friend Forbes in editing *British and Foreign Medical Review* and the *Cyclopaedia of Practical Medicine*. While living at Warwick Conolly maintained his interest in the neighbouring town of Stratford-on-Avon, and successfully led the inhabitants of the town against a proposal to remove the body of Shakespeare from its resting-place. Not only was he one of the pioneers—if we may refer to them as such—of the Metropolitan Counties Branch, but earlier (about 1830) he was most closely associated with Hastings and Forbes in the foundation of a medical society—the Provincial Medical and Surgical Association—afterwards to become the British Medical Association.

Conolly returned to London in 1839, and was appointed resident physician to the Middlesex Asylum at Hanwell, then the largest institution of its kind in England. He devoted himself there to the principles enunciated by the Tukes, emancipating the asylums from the role of prison houses, and freeing the lunatics literally from their straitjackets and chains. Within the 12 years during which he was supreme at Hanwell a revolution was effected throughout the country in the management of the insane. His sincerity and enthusiasm overcame every difficulty, and by dint of great devotion and eloquence he was able to convert not only our profession but also the public to a complete reorientation of attitude towards the insane, and a consequent revolution in their treatment. In all this he generously acknowledged his obligations to the Tuke family, and the methods of which in this country they were the pioneers at the York Retreat. He maintained positively, in his own words, "There is no asylum in the world in which mechanical restraint may not be abolished, not only with safety, but with incalculable advantage." From this flowed a further great advantage—the proper study of insanity; for the study of insanity as a disease began when asylums ceased to be prisons. Unfortunately, some of Conolly's literary labour was devoted too much to destructive criticism of the older methods of asylum management, rather than to constructive minute investigation or patient research, and, being of Irish descent (his father mentioned by Dean Swift), his writings are tainted with some sentimentalism and on occasion an overindulgence in rhetoric, which detracts from their scientific value. About 1852 he resigned his post at the asylum, but ran a private asylum in the village of Hanwell, and although, as I have already indicated, his early years do not shine with success, he appears now to have had a large consulting practice in mental disease.

Conolly's best and most eloquent works belong to the later period of his life, when he wrote extensively on the treatment of the insane. Oxford University awarded him the Hon.D.C.L. in 1852, and on the occasion of his resignation from Hanwell a great public testimonial and his portrait were presented to him, the presentation being made with imposing ceremony by Lord Shaftesbury, Chairman of the Lunacy Commission. He died in 1866 at Hanwell, after a series of what would appear, in the light of modern knowledge, to be cerebral vascular attacks.

Francis Sibson

Francis Sibson (1814–76) (whose name appears here as Chairman of Council in 1865–6 and 1867–8) is worthy of note for his varied career. Like many of his contemporaries, he took his diploma (1831) at the Royal College of Surgeons, Edinburgh, as a first step. Before turning to a more serious and thorough study of medicine, Sibson was apprenticed to a surgeon—and served in the cholera wards around Edinburgh and Leith, then settled in general practice at Cockermouth, but soon left to continue his studies at Guy's, where he had the distinction of being a friend and pupil of Hodgkin. He had the further distinction of being the first physician appointed to St. Mary's Hospital, which was opened in 1851, and one of the first lecturers at its Medical School. He published papers on the flexible stethoscope and on the "mechanism of respiration" and articles on ether, chloroform, and narcotic poisons. These publications were all made before he came to London, and in fact while he was in Nottingham, as resident surgeon and apothecary to the General Hospital; and when he came to London about 1850 he obtained the M.D. London, becoming F.R.C.P. in 1853; he was made an F.R.S. in 1849. At the Royal College of Physicians he was Goulstonian, Croonian, and Lumleian lecturer and curator of the Museum. He was a member of the Senate of London University, and it may interest the ladies to know that he opposed the admission of women to degrees of the University.

Sibson's remarkable versatility was also exemplified in his demonstrations of visceral anatomy—a course which he arranged at his own house in Brook Street, and which commanded a remarkable attendance. He also published an atlas of anatomy, illustrated with coloured plates—a laborious and useful work of reference, illustrating specially the relative positions and movements of the internal organs. He wrote extensively, and was a man of great industry. All his works of permanent importance are published in four volumes—the *Collected Works of Francis Sibson*, including several contributed to *A System of Medicine*, by Sir John Russell Reynolds. He was particularly expert in publishing his own *observations*. He died suddenly at Geneva. During his lifetime he appears to have enjoyed a considerable practice as a physician, in addition to his innumerable adventures as anatomist and author.

Ogier Ward

Thomas Ogier Ward (1803–79) is worthy of our attention as the first Secretary of the Metropolitan Counties Branch—a position which a perusal of the *Journal* shows he filled with much industry and all the initiative, intuition, and tact necessary on any new venture. I am grateful for the collaboration and help of his grandson—also Ogier Ward—whom many of you undoubtedly know as consulting surgeon to St. Peter's Hospital, who has been kind enough to supply at my request a few facts regarding his grandfather. They demonstrate not only his unique ability as our first Secretary, but his originality and, as with Francis Sibson, his expertness in observation. While practising in his early days at Wolverhampton, during the great cholera epidemic of 1834, he achieved a greater measure of success in treatment by putting into practice his observation that the collapsed patient was much helped by hot baths. Another of his observations was made while holding the post of physician to the Birmingham Dispensary—this time in cardiology. He showed that the "bruit de diable" (now known as the "venous hum") was produced in the veins and not in the arteries.

As with his contemporaries, he seems to have moved about, practising in Kensington at the time of his secretaryship, and ending up, like his friend and colleague Sir John Rose Cormack, in France. Indeed, while Cormack was tending the British colony during the siege of Paris, Ogier Ward was experiencing the discomfort entailed by the billeting of German troops while living at Caen and St. Germain.

It may be of interest that the conception of the Metropolitan Counties Branch first arose at the Annual Meeting at Oxford, as a result of a conversation between Dr. Cormack and Dr. Ogier Ward.

Formation of the Branch

The actual proposal to form the Branch was, strangely enough, made by Dr. Charles Cowan, of Reading, who expressed the hope that places within convenient railway distance of London, such as Reading, would be embraced in the Metropolitan Branch, and that it was to be representative enough to exclude any cleavage as between "provincial" and "metropolitan." It appears to have been one of the first Branches formed throughout the country. Membership of a Branch was automatic upon the payment of 2s. 6d., in addition, of course, to the £1 1s. membership to

the parent Association. A rather amusing and potentially serious interlude arose very early upon the question of this automatic membership. It was sought to exclude a member, and the method adopted was to add to the clause relating to the admission of members the words "provided the majority of members present at a general meeting concur in their admission." This particular gentleman had paid over his 2s. 6d. to one of the officials of the publishing department, but next day found himself without membership, owing to the rather precipitous alteration of the by-law, and minus 2s. 6d. He was none other than Mr. Wakley, the editor of the *Journal's* great rival, the *Lancet*, and the lead in excluding his appears to have been openly taken by none other than the *Association Medical Journal's* editor, Dr. Cormack, who committed himself so far as to say that "as Mr. Wakley was so highly unacceptable to the majority of the members his presence among them would destroy the Branch from the numerous resignations it would occasion." A number of collateral issues and problems were connected with this episode, and did literally stir the profession and its conscience. There was a practice, very prevalent at the time, of the publication of biographies of medical notabilities and other aspirants seeking public notice during their lifetime, often with portraits. This system of biographies of the living (sometimes indeed autobiographies) had almost become a kind of moral pestilence in the profession, and amounted frequently to open advertising, as in the case of one gentleman who had ordered 15,000 copies of his biography to be distributed throughout the country, and in that of another who permitted his butler, when his patients were leaving the house, to offer each of them a book, saying, "Have you seen my master's biography?" Or the traffic in biographies could go the other way, leading almost to victimization and ruin, by the publishing of abusive biographies in medical periodicals. The unpopularity of Wakley was bound up with this, for the *Lancet* of 1853 was accused on more than one occasion of murdering its victim, even if it did subsequently bury him with honours. Possibly the first great meeting of doctors to be held in this country took place at the Hanover Rooms, London, organized by this Branch in 1853—the issue being biographical advertising. The meeting, however, was not ostensibly called for this purpose. It was called—as indeed similar meetings were called throughout the three kingdoms and all well attended—to protest against the dismissal of a surgeon, a Mr. John Gay, from the Royal Free Hospital. Mr. Gay seems to have had no responsibility for or initiative in the biographical sketch which was the cause of his dismissal, and which would appear to have been offensive to the management committee chiefly because of the statement that the hospital would be unknown were it not for the repute of Mr. Gay. Wakley, whose son was also on the staff of the Royal Free Hospital, was suspected of having had some hand in the initiation of Gay's dismissal. The case was not a good one for the purpose of making an example of doctors by doctors, but it provided wide opportunity for the ventilation of the whole subject of biographical advertising, which was profoundly disturbing the profession. The proceedings were remarkable not only for the immense attendance at the London meeting of 1,200 doctors, and similar attendances throughout the country, but also for the fine discrimination manifest in debating the two big issues—the palpably wrong dismissal on this occasion by a lay management committee, and, secondly, the growing evil of biographical advertising.

Representation in Parliament

One of the questions which exercised the Branch in its first year was the representation of the profession in Parliament. The comparatively imminent measures of medical reform and public health, already much in the minds of leaders in the profession and others, provided the chief stimulus for the obviously altruistic desire for medical representation in Parliament; indeed, a special Franchise Committee was appointed, and the rather roundabout procedure was advocated of first securing Parliamentary representation of the University of London, when presumably it was anticipated that the medical element amongst the graduates would be strong enough to secure the election of a medical member to Parliament. The University of Edinburgh at that particular time, and possibly for some time afterwards, would appear to have had a preponderating number of medical graduates, and might reasonably have been expected to compete with London for the honour of actual representation.

In these days of almost penal taxation it may be of interest to note that the problem of what they called "the income tax" absorbed sufficient attention in 1852 for the Association to appoint a special Income Tax Committee, and that the second meeting of this Branch was called for the purpose of petitioning both Houses of Parliament and of appointing a deputation to the Chancellor of the Exchequer, protesting against the iniquities of taxation. The overriding preoccupation of the meeting seems to have been that taxation of income (as against property), which, as you may know, fell into abeyance for a short time, would be reimposed, and the fear was expressed by Dr. Cormack that "the income tax" might even become permanent. To us, with our considerable sophistication in matters of taxation, the pleas put forward by our predecessors 100 years ago demonstrate a refreshing innocence, and may even be regarded as amusing; for instance:

"*The Humble Petition . . . showeth*—

"That your petitioners have, for the most part, no other income than that derived from their professional exertions.

"That their income so derived is uncertain and precarious, necessarily ceasing under illness, in advanced life, and at death.

"That considering their position in society, the exercise of their profession requires them to maintain unusually expensive establishments, involving considerable direct taxation.

"That your petitioners are, for the most part, married men with families, for whose education and present and future support they have to provide by these uncertain and precarious incomes, and under the contingencies of illness, advanced age, and death.

"That your petitioners represent, moreover, that their lives are shorter, they are more liable to accidents and disease, frequently communicated by their patients; and that the decline of their professional incomes is earlier than in any other profession.

"That for the above reasons and others that might be adduced, the capitalized value of the precarious income of a medical man is not only below that of an income derived from a permanent annuity, but is also even considerably below the value of a received life annuity, which itself is scarcely half the value of a permanent annuity.

"That for the above reasons and others that might be added your petitioners feel it a great grievance, and cannot but consider it most unjust that their professional incomes, thus precarious, should be taxed at the same rate as incomes derived from realized property.

"And your petitioners, therefore, humbly pray that it may please your Honourable House so to deal with the income-tax, if it be indispensable to retain it, that its pressure on medical men and others whose incomes are temporary and uncertain, may be equitably adjusted in proportion to their real value.

"And your petitioners will ever pray, etc."

Seed of Medical Reform

The year 1852 is also marked by the germination of the seed of medical reform. The seed had been sown many years before and the subject had been discussed for a long time in a rather desultory manner by the doctors, amongst others; but it was only at the Annual Meeting at Oxford in 1852 that a decision was taken that a draft Bill on medical reform which had been prepared by the Central Council should be referred to Parliament. A strong deputation, headed by Sir Charles Hastings and the President and other leading members of the Branch and about 60 M.P.s, waited on Lord Palmerston to present the draft Bill, whose provisions, as you well know, were uniformity of qualification,

equal right to practise throughout the United Kingdom, and the adoption of the representative principle in the formation of the councils and other governing bodies.

As might be expected, one of the greatest difficulties throughout the long controversy on medical reform had been the clash of interests, the interests now of this College of Physicians and Surgeons, now of that. Viewed in retrospect, this was not without its humorous side. When, for instance, there arose the high probability that there would be registered as surgeons persons who were only licentiates of the Society of Apothecaries, one well-known critic expressed his conviction that the examination at Apothecaries' Hall was more conducive to public safety than that of the R.C.S., and that the examination of the College was no test of fitness for the discharge of any duty connected with the profession: that the object of the College of Surgeons appeared to be to form two distinct classes—the one a superior grade, the consulting surgeon, the other an inferior grade, to make and find work for the superior. It is of much interest at the present moment to recall the proposition made about this time for the establishment of "The Royal College of General Practitioners." There is in the minutes of the R.C.S. a record of negotiations between the R.C.S. and the R.C.P., the Society of Apothecaries, and a body known at the time as the National Association of General Practitioners; and an account of a meeting at the R.C.P., with a resolution that a Charter of Incorporation should be granted to the surgeon apothecaries of this country under the title of the Royal College of General Practitioners of England. It is also of interest that the medical Bill drafted in 1852 which substantially became the epoch-making Act of 1858 was drafted by a barrister, Mr. George Hastings, M.P., the son of the founder of the Association and Secretary of the Medical Reform Committee.

One of the anomalies of the time was that even if a doctor had the highest university honours he had not the right to practise in London, but must also obtain a licence from the College of Physicians, and this particular licence did not qualify him to practise out of London.

The highly commendable aims for the better education of the doctors, and their increase in status and usefulness, was probably the chief stimulus in seeking medical reform. Another stimulus was undoubtedly the considerable competition of quacks, of whom in 1851 there were estimated to be 21,400 in the country. As a forerunner of osteopathy, with its original and only pathology in the spine, came also from America the system known at the time by the rather significant name of "Coffinism." In this system the pathology of all disease is in the stomach, and consists of a "canker or vitiated secretion" that forms in the stomach or bowels to a greater or less extent, and interferes, presumably, with the function of the stomach. The adherents of the "Coffinite" school did appear to exhibit some versatility in their choice of what they considered necessary to remove this "vitiated secretion." At one inquest we read of the death of a woman suffering from hernia, the treatment consisting of jalap, cayenne pepper, and gin, a drachm glassful every morning—the verdict, "Death from natural causes." At another inquest a man of 27 suffering from cholera, so common in Britain at the time as to require the establishment of special cholera hospitals, was found at the post-mortem examination to have present in his stomach the same ingredients, plus ginger, plus lobelia. Lobelia seems to have figured very largely in the therapy. Dr. Letheby, lecturer on chemistry at the London, at this particular inquest stated that he had known 22 deaths from lobelia (whilst in America the cases were very much more numerous). The coroner in this case observed in the summing-up that he had on two occasions sent this particular quack for trial for manslaughter at the Old Bailey, but that the judges took a view of the cases different from that entertained by the juries. The juries, we can be pretty sure, did not themselves always entertain the correct view. The Coffinites were also referred to as "botanical physicians" or "Thompsonians," one Thompson being the first plausible exponent of the system. Thompsonian quacks maintained several journals in America and one in London, although the actual cult seems to have been more widespread in the provinces than in London. The textbook was entitled *The Practice of Medicine on Thompsonian Principles*, by J. W. Comfort, M.D. The terms "Coffin" and "Comfort" in the same context are noteworthy and even cynical! The textbook had reached its fourth edition by 1853, and was a portly tome of 582 octavo pages.

Homoeopathy, which appeared to start as a reaction simply against over-drugging, was classified by orthodox physicians at the time as quackery, and our Association did draw up regulations for keeping homoeopaths out of the Association and for expelling them if they were found to profess or practise homoeopathy.

Other aspects were troubling the doctors and guiding their thoughts in the direction of medical reform. There was, for instance, no protection against any man calling himself M.D., M.B., or surgeon; and the registration of pharmaceutical chemists had given them a status and recognition, especially in the towns and villages of the provinces, which the doctor did not possess, and which had every appearance of supplanting him. Then there was also the facility with which the advertisements of quacks and their nostrums were published in the newspapers and in religious periodicals, especially of the provinces and in the Colonies.

The profession therefore had every reason at the time for seeking the highest possible representation in Parliament, with a view to ultimately securing the largest measure of medical reform.

Another of the formidable problems of 1852–3 concerned the Vaccination Act, making vaccination compulsory about that time. The controversy is interesting, as demonstrating the first efforts to crystallize medical opinion on a question of social policy. The effort was late, it is true, for the Act appears to have been rushed through Parliament in the first instance, without reference to or collaboration with the profession. The doctors at the time appeared to speak with different voices, and presumably when an amendment to the Act was suggested they did get together in a really *representative* way. It is of interest, also, that for the first time the suggestion was made that the opinion of counsel should be sought on how far the Government, by putting vaccination in the hands of the Registrar-General, had made itself responsible for all the expenses which might be incurred.

The Gratuitous Advice Committee

The question of gratuitous advice and the abuses alleged in hospital and dispensary practice appear to have assumed such high proportions that in 1853 the Branch actually called a further special committee into being, the Gratuitous Advice Committee. The abuses alleged would appear to have existed only in the metropolis, hence the special move in this Branch, but the impact of these abuses would appear to have affected not merely the pockets of the doctors but also their ethics—so much so that we find this particular committee working with the Ethical Committee of the Association in the collection and digesting of facts and opinions of various contributors. In the machinery for collecting these we also see the first suggestion of a questionary.

While recognizing the motives of kindness and charity, and the definite moral obligation of a generous profession to give unpaid advice to the poor and the necessitous, the allegation was made that special dispensaries or clinics sometimes sprang into existence, not to meet the exigencies of the poor, but to bring before the public notice some struggling member of the profession wishing to make himself known. There was the further charge that, although these gentlemen gave their advice gratis, some of them had entered into collaboration with the chemists, receiving a percentage on every prescription; and it was even reported that an F.R.C.P. who was the proprietor of a chemist's shop

constantly attended there to audit his accounts. Something had to be done about it, and the terms of the special committee were those of inquiry in the first instance. Ten questions were sent out to the whole profession, questions which admitted of an answer more than a simple "yes" or "no." In comparison with the charge of apathy which seems to afflict us in this modern age, it would appear that, even then, 2,000 such inquiries drew only 250 replies.

Medical News Items in 1853

Those were the chief problems and controversies of the times, which I have purposely not followed historically to their solution. Many of them, indeed, are much too protracted and involved to be dealt with in the time at my disposal, but it may be of interest to mention a few of the subjects treated in the articles and correspondence at the time and debated at meetings. In 1853 there was a report of a court-martial on a medical officer acquitted of the charge of "conduct disgraceful to the character of an officer and a gentleman," in having subjected himself to the indignity of being publicly kicked; all he appeared to have done was to decline to fight a duel.

On April 7, 1853, Dr. John Snow administered chloroform to Queen Victoria in labour, and this event gave rise to much discussion and many letters in the pages of the *Journal*.

On June 7, 1853, the Irish Medical Association was formed at Dublin upon the model of our own Association. Interesting articles of the time appear on medical ethics, arrears in subscriptions, lunacy acts, advertising, apathy, cholera, and a suggestion for "the establishment in London and other medical schools of a Medical Students' Association."

The year 1853 also saw the foundation of the Medical Benevolent College at Epsom. There are articles illustrating the poor conditions and salaries of medical men doing Poor Law work and of medical officers in the Army and Navy, also on sanitary legislation and preventive medicine.

Conclusion

This review of our founders and their problems has been necessarily sketchy. You may have been impressed, as I have, with the versatility of many in that generation. Certainly their accomplishment in languages and in the literary field reached a perfection which most of us must envy. Compared with them, our present set-up and our outlook is rigid. They seem to have been at all times flexible, not only in thought but in method and in action. We must marvel for instance at the facility with which some of them changed the location of their practices and appeared to take up new roots with great success and with no inhibition as to the future. Above all, certainly on the great question of medical reform and everything that went with it—the increased stature of the doctor, protection of the public, and so on—these pioneers played their necessarily formidable part, as did the parent association. On the question of medical reform they were nearly 40 years ahead of contemporary thought, for the Act of 1858 only granted half of what was in the profession's mind 20 years before, and which did not become law until 1886, and it is probably no exaggeration to say that they blazed a trail through a forest of contention and prejudice, even of the medical corporations at the time, one of which was even accused of selling midwifery licences, and encouraging the creation of a vast number of Members and Fellows for pecuniary gain.

On medical reform the ideal and the approach of our medical forebears transcended the narrow and self-centred outlook of the licensing bodies, and indeed of some Universities. As an Association it should give us heart to recall their courage and their altruism, so that, when necessary, we can remind modern public bodies, whether educational or administrative, of the greatness of our heritage.

AN OUTBREAK OF TRICHINOSIS IN LIVERPOOL IN 1953

BY

ANDREW B. SEMPLE, V.R.D., M.D., D.P.H.
Medical Officer of Health and Port Medical Officer, City of Liverpool; Professor of Public Health, University of Liverpool

J. B. MEREDITH DAVIES, M.D., D.P.H.
Deputy Medical Officer of Health and Deputy Port Medical Officer, City of Liverpool

W. E. KERSHAW, V.R.D., M.D., D.T.M.&H.
Lecturer in Medical Parasitology, Liverpool School of Tropical Medicine

AND

C. A. ST. HILL, M.B., Ch.B.
Consultant Pathologist to Royal Southern Hospital, Liverpool; Lecturer in Clinical Pathology, University of Liverpool

[WITH SPECIAL PLATE]

An outbreak of trichinosis occurred in the Liverpool area in late October and early November, 1953. In the past, localized epidemics of this disease have occurred in various parts of the country, and these have been reviewed by Young (1947). Sheldon (1941) and Jolly (1941) reported the epidemiological features of an outbreak in Wolverhampton, and Evans and Lennox (1953) a somewhat similar occurrence in the Borough of Barry. The main reason for giving an account of this outbreak is that it presented an admirable opportunity of studying the epidemiology and clinical features of trichinosis. The parasitological and pathological findings will be reported in greater detail in the *Annals of Tropical Medicine and Parasitology*.

The first of the 82 cases traced came to our notice when Dr. Robert Kemp telephoned on Friday, November 6, to say that he had just seen a case on a domiciliary visit which he suspected was trichinosis. This patient was admitted to hospital and the diagnosis was later confirmed by muscle biopsy. However, as the clinical findings were so suggestive of trichinosis, inquiries were made immediately in the same and other hospitals, and three further suspicious cases came to light.

It was felt that these cases might be part of a more widespread outbreak, so a letter was sent from the medical officer of health to all general practitioners and consultants describing features of the cases already seen and requesting that he be informed of any further suspected cases. There was a prompt and most helpful response, and cases continued to be reported until the third week in November. All patients were visited by a doctor from the Health Department, and the clinical data presented below were collected in this way. Epidemiological investigations were carried out by two sanitary inspectors, and health visitors undertook the follow-up visits on all the cases.

Epidemiology

The first case occurred on October 25 and the last one on November 18, and the dates of onset of the cases are shown in Fig. A. Those cases in which the diagnosis was confirmed by muscle biopsy are specially

marked; it will be seen that they include the first and last cases. The outbreak rapidly rose to a peak during the first week of November, but died away more slowly, 24 days separating the date of onset of symptoms in the first and last cases.

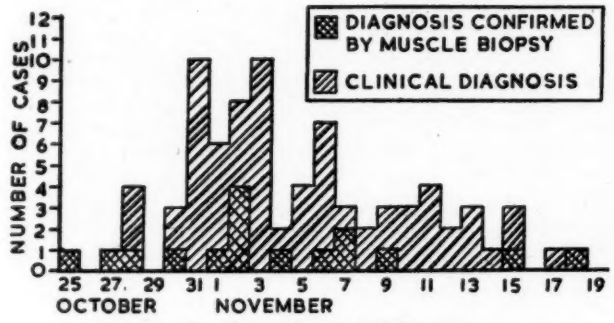

DIAGNOSIS CONFIRMED BY MUSCLE BIOPSY
CLINICAL DIAGNOSIS
NUMBER OF CASES
0 1 2 3 4 5 6 7 8 9 10 11 12
25 27 29 31 1 3 5 7 9 11 13 15 17 19
OCTOBER
NOVEMBER

FIG. A.—Date of onset of the cases.

Patients were traced from all parts of the city and surrounding districts on the north bank of the River Mersey, but the majority lived in the northern part of this area. There was no evidence that different dates of onset were related to the area in which the patient lived.

Source of Infection

(1) *Sausages.* The earliest inquiry suggested that sausages of a certain local firm were most likely to be the cause of infection as the early cases gave a history of eating these sausages, and many of the patients had eaten them raw. Further confirmation came when one of the patients was found to be working in the sausage factory concerned, and reported that she habitually nibbled at raw sausage-meat whilst at work. The diagnosis in her case was established by muscle biopsy. Later, another worker in this factory was found to have developed trichinosis at the same time, and he also gave a history of tasting raw sausage meat whilst at work. As more and more patients were questioned, the connexion between this firm's sausages and infection became more firmly established, as 12 of the patients were employees of the firm—seven butchers, three grocery personnel, and two workers in the sausage factory. Of 82 cases (Table I) 67 gave a history of eating these sausages (34 raw and 33 cooked). In 10 further cases there was a less definite connexion, as these persons had either handled infected sausage or eaten cold sliced ham bought from a shop known to have dealt with infected sausages. It was impossible to obtain accurate information in three of the cases.

TABLE I.—*Eating Habits in* 82 *Cases of Trichinosis*

	No. of Cases
Infected sausage eaten (raw in 34 cases; cooked in 33 cases)	67
Persons handling infected sausage but not eating any, or any pork product except bacon	5
Persons who ate cooked sliced ham from firm handling infected sausage meat	5
Persons eating pork from different sources (no sausage and no product at all from firm handling infected sausages)	2
Story unreliable through lack of data	3

(2) *Pork.* There were two persons, however, both reliable witnesses, who were emphatic that they had not handled or eaten any material from the firm involved, and the diagnosis in both cases was undoubted, on clinical grounds, though it was not possible to carry out muscle biopsy. These two cases suggest that at least two or more infected carcasses must have been involved. One of these patients was a widow of 63 living with her two daughters; she bought a joint of pork on October 31 from her butcher, cooked and ate it hot with her daughters on Sunday, November 1. The pork was then placed in the meat safe and she finished off the joint cold on Wednesday, November 4; in doing so, she ate the meat close to the bone. She then gave her dog the bone; this animal was violently sick the following day. The patient developed a typical clinical attack, with swollen eyes, headache on the 12th, and was found to have an eosinophilia. In addition, the dog developed swollen eyes and conjunctivitis on the 14th, A biopsy on the dog was refused, but there seems little doubt that this animal had also developed trichinosis. The other patient in whom no connexion was traced also gave a history of eating pork at the same time as the case just described, and it was found that both butchers, who were widely separated in the city, received one half-carcass of pork from the abattoir on October 24. No record mark is kept of the individual animal carcass delivered, and it has been impossible to trace whether both came from the same pig. There is a need for some form of record which would permit the tracing of such a finding to a particular animal and piggery. In both cases epidemiological investigation pin-pointed the particular carcass involved, but it was impossible to follow up our findings any further.

The investigation was then concentrated to see whether there was any possible connexion between the infected pigs delivered to the sausage factory and those delivered to the two butchers on October 24, as it was felt that the obvious disadvantage of suggesting two different infected sources would be greatly minimized if it could be shown that the pigs came from the same piggery. Once again the lack of adequate marking of individual pig carcasses made it impossible to check on this point. It is, however, of interest that the abattoir supplied both sausage factory and butchers, and that at that time a large consignment of pigs which was going to a bacon factory was diverted for ration meat but was found to be too fatty and, in consequence, most was used for sausage-making. It is, however, possible that one or two carcasses went to butchers for rations and that these, together with the carcasses which went to the sausage factory involved, came from the same infected source.

Methods of Infection

Anderson and Arnstein (1953) state that heating to a temperature of 58° C. for a few minutes kills the *Trichinella* larvae in pork, and that freezing to a temperature of —18° C. for at least 24 hours is required to kill them.

It is easy to understand how infection occurred in the 34 patients eating raw sausage. In a further 33 cases there was a history of eating cooked sausage (Table I), although this group also contained many who handled raw sausages and cooked them. Many of these persons were emphatic that their sausages were not grossly undercooked, and this suggests that what is regarded as ordinary cooking may not destroy all larvae. This is not surprising when it is recalled that the centre of a sausage is often relatively undercooked. The two cases traced to pork roasted at home also suggest that larvae deep in the joint may not be destroyed, and that thorough cooking may be required to render pork completely safe.

The experience of the five persons giving a definite story of handling but not eating any infected sausage, or any other product connected with the outbreak, is most interesting. Infection in these cases probably resulted from either infected sausage-meat on the hands being conveyed accidentally to the mouth indirectly, or by a knife used first to cut sausages and later to prepare a cold dish without adequate cleansing. The former probably occurred in the butchers infected and the latter in the kitchen when the housewives became infected. In all these cases the individual readily agreed that one of either suggestions could have occurred. Infected knives also probably resulted in the five cases traced to cold cooked sliced ham bought from a shop also selling infected sausages.

Characteristics of the Outbreak

Age and Sex Incidence.—Out of 82 cases, 20 were males and 62 females. The full age and sex incidence is given in Table II. The higher incidence in the females than the males is made the more impressive when it is realized that

TABLE II.—*Age and Sex Incidence*

Ages	Men	Women
0–14 years ..	1	4
15–24 „ ..	0	5
25–34 „ ..	8 (2 butchers + 1 sausage worker)	12 (1 sausage worker)
35–44 „ ..	4 (2 butchers + 1 grocer)	20 (1 grocer)
45 years and over	7 (3 butchers + 1 grocer)	21
Total ..	20	62

10 of the men were employees of the firm involved (butchers, grocery assistants, or worker in the sausage factory), but only two of the women worked for the sausage company implicated. Forty-one of the cases occurred in women over 34, and of the 21 cases in women over 44, 11 were habitual raw-sausage eaters or nibblers. That these women, most of whom have eaten raw sausages for years, should develop trichinosis so late in life suggests that either overt infection is uncommon in Liverpool or that the immunity from any previous infections is inadequate to suppress completely the clinical symptoms on further exposure.

Occupation.—It was noted time and again that the only person affected in the household was the housewife who did the cooking. Further evidence that those handling raw food were in a more vulnerable position came from the finding that 10 male workers in the firm were clinically affected. In most instances the association could be easily explained by the eating or tasting habits of the individual involved. Occasionally there was an emphatic denial of these habits, and the inadvertent finger in mouth or infected knives probably explained these.

Incidence of Raw-Sausage Tasters in General Population (Adult Females)

Sheldon (1941) showed that the eating of raw sausage-meat was a fairly common habit in Wolverhampton. During the present outbreak health visitors, on every routine visit made in the course of their work, were asked to inquire into the habits of the housewife in the family. The following results were obtained:

Housewives interviewed	3,412
No. of housewives eating or tasting raw sausage ..	497
No. of housewives not eating or tasting raw sausage	2,595
No reply	320

From the 3,092 replies received 497 (16.1%) of the housewives were found to be habitual raw-sausage eaters or tasters.

Incubation Period

In only very few cases was it possible to obtain accurate information on the incubation period. This was mainly because most persons usually ate the same kind of meals from week to week, obtaining their supplies from the same source. In two cases there were two phases of the illness. The first case was that of a man who developed an acute attack of diarrhoea and vomiting on October 25. He was very ill, had blood in his stools, from which, however, no pathogenic organisms were isolated, and was admitted to the isolation hospital. He was discharged from hospital on November 4, but developed sudden swelling of the eyes, headache, and pyrexia on November 7, and was readmitted. Larvae were found in a muscle biopsy on November 21. If it is assumed that the acute gastro-enteritis symptoms developed within one to two days of eating the infected meal, this gives an incubation period measured to the initial general symptoms of 14–15 days. This patient's wife was also affected, but her first symptoms were general, developing on November 8. The second case had an interval of 13 days beween diarrhoea and eye-swelling. In three other patients there were intervals of 10, 12, and 15 days between the last meal of sausages or pork products and symptoms.

Symptomatology

In former outbreaks of trichinosis in this country the symptomatology has been described mainly of the more serious cases which had been admitted to hospital. An attempt has been made in this outbreak to obtain full clinical details from all types of patients affected, including many of the milder cases treated at home; 22 were admitted to hospital and 60 remained at home. Most of the patients seen were treated by their general practitioner, but a few, who had not attended a doctor for their symptoms, were discovered by health visitors; these persons were advised to consult their general practitioners.

It is of importance in such an investigation to ensure that no case was included which was not suffering from trichinosis. The only certain method of establishing the diagnosis is the demonstration of larvae by muscle biopsy; this was obtained in 16 cases, and included three patients with milder disease treated at home. In most of those patients in whom a muscle biopsy was not carried out the diagnosis was easy to make clinically, as they presented a clear history, together with typical physical signs, and showed a marked eosinophilia. In the absence of eosinophilia the diagnosis was made only in exceptional circumstances, but it was found that four patients in whom larvae were found on muscle biopsy had normal eosinophil counts on the 11th–17th day of disease. All cases doubtful on clinical grounds were excluded.

The incidence of the symptoms presented by 82 patients is given in Table III, and it will be seen from this list that these varied considerably from case to case. The classic

TABLE III.—*Incidence of Symptoms in 82 Cases*

	No. of Cases	%		No. of Cases	%
Swelling of eyes ..	82	100	Delusions and light-headedness ..	9	11·0
„ „ face ..	61	74·4	Splinter haemorrhages under nails ..	8	9·8
Muscular pains ..	77	94·0	Diarrhoea	7	8·5
Headache (frontal in 64 cases)	72	87·8	Cough	7	8·5
Photophobia ..	54	65·9	Conjunctival haemorrhage	5	6·1
Insomnia	46	56·1	Swelling of legs ..	3	3·7
Constipation ..	29	35·4	Semicomatose ..	2	2·4
Neck stiffness ..	26	31·7	Cerebellar signs ..	1	1·2
Lethargy	26	31·7	Monoplegia	2	2·4
Vomiting	24	29·5	Wrist-drop	1	1·2
Disturbance of balance or dizziness ..	23	28·0	Coma	1	1·2

picture of an illness of infection or a gastro-intestinal upset, followed 10–14 days later by general symptoms, was seen in only two cases. In spite of this, many of our patients presented a somewhat similar history, and the following is a detailed description of the commonest signs and symptoms.

Signs and Symptoms Commonly Seen in Patients During the Outbreak

Onset.—In most cases this was sudden, the usual story being that of a patient noticing marked swelling of the eyelids on waking one morning. This swelling was the only finding constant in every patient, and varied from puffiness just below the lower eyelids to gross oedema of the eyelids spreading on to the face, sufficient almost to obscure the eyes. It was usual for the oedema to increase for two to three days and then to disappear more gradually. The oedema became more noticeable after the patient had been lying in bed for some hours. Patients almost invariably have had some pyrexia at the time of the swelling of the eyes, and the temperature most commonly was in the range 100–103° F. (37.8–39.4° C). Some pyrexia often persisted for two to three weeks, and usually the temperature gradually subsided over this period.

Headache.—This was present in 72 patients (87.8%), was mainly frontal, and was located by many as being behind the eyes. It usually began after the swelling of the eyes had been present for about 24 hours; in a few persons, however, headache did not develop till a few days later. Headache was a distressing symptom; many patients described it as severe and likened it to a feeling as if the

A. B. SEMPLE, J. B. M. DAVIES, W. E. KERSHAW, AND C. A. ST. HILL: OUTBREAK OF TRICHINOSIS IN LIVERPOOL IN 1953

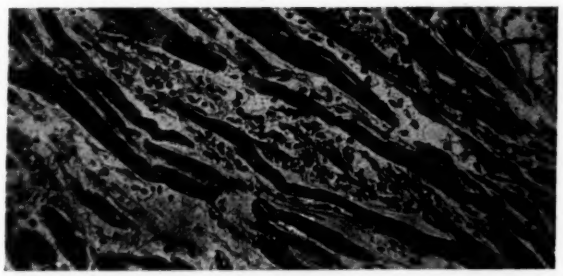


FIG. 1.—An area of early polymorphonuclear and eosinophilic infiltration between heart muscle fibres. (×120.)

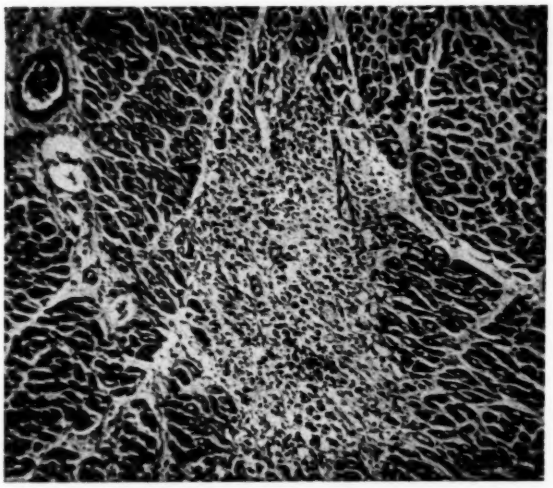


FIG. 2.—A small area of necrosis of heart muscle fibres. (×40.)

FIG. 3.—Showing a partially developed larva bent upon itself and lying longitudinally in the axis of the muscle fibres in an unstained fresh preparation. Seen with some difficulty. (×54.)

FIG. 4.—Showing a more developed larva arranged spirally in the muscle in an unstained fresh preparation. A cyst wall has not yet been formed. (×54.)

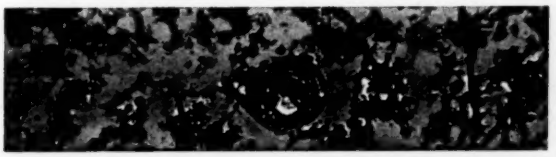


FIG. 5.—Showing a nearly mature larva in the muscle digest. (×54.)

FIG. 6.—Showing a larva lying in the muscle in a fusiform focus of necrosis with cellular reaction at each end. The cavity in which the coiled-up larva lies is probably an artifact and probably does not represent the early stages of formation of the cyst. (×54.)

P. JEWELL, T. PILKINGTON, AND B. ROBINSON: HEPARIN AND ETHYL BISCOUMACETATE IN PREVENTION OF VENOUS THROMBOSIS

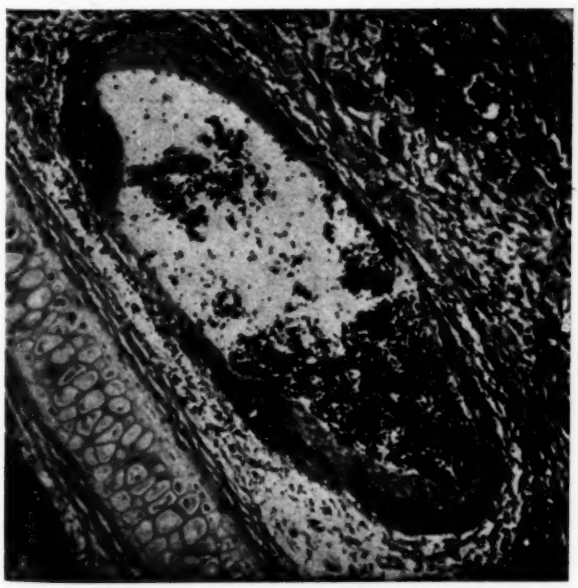


FIG. 1.—Section of an ear vein showing a small mural thrombus. Rabbit had received ethyl biscoumacetate. (H. and E. ×60.)

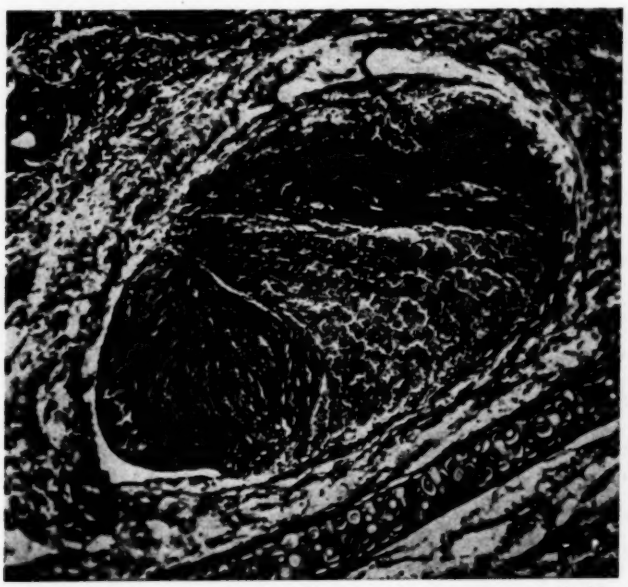


FIG. 2.—Section of an ear vein showing complete occlusion. Rabbit had received heparin. (Picro-Mallory. ×50.)

K. L. MARKS: CONGENITAL SYPHILIS DIAGNOSED BY BONE CHANGES

FIG. 1.—Showing marked decalcification of the submetaphysial zone in the radius and ulna.

FIG. 2.—Showing thickening of the temporary zone of calcification in the femur.

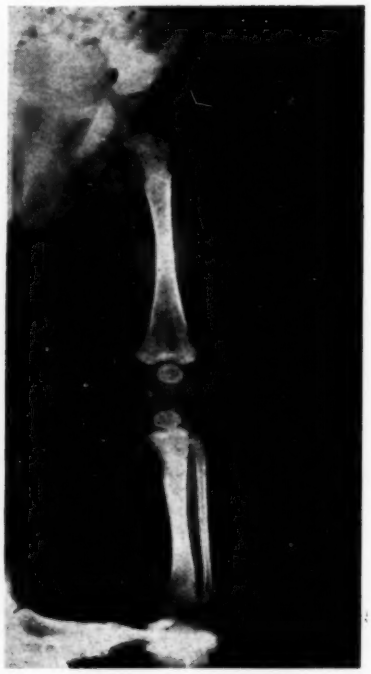


FIG. 3.—Showing irregular decalcification at the proximal end of the tibia.

G. SZABÓ: NUMBER OF MELANOCYTES IN HUMAN EPIDERMIS

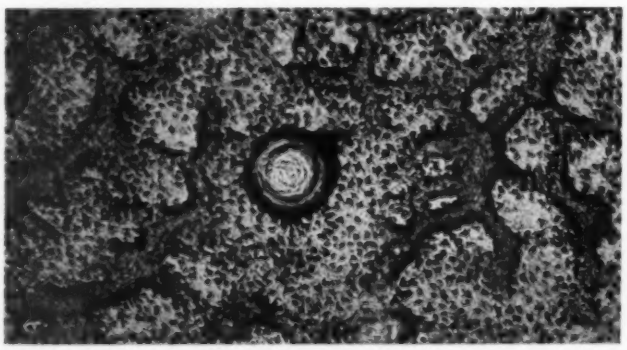


FIG. 1.—Epidermis of skin from behind the ear (Sp. 16): dopa preparation. Note the abundance of melanocytes and the conformation of the epidermis. (×95.)

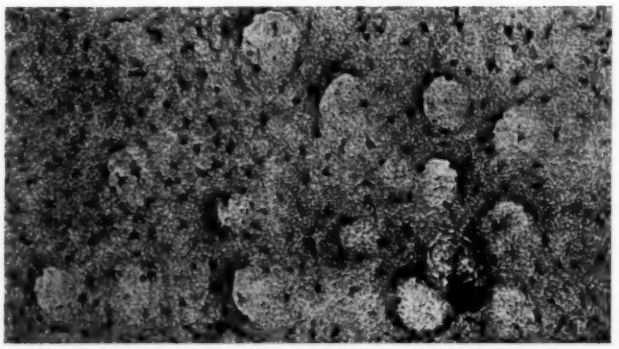


FIG. 2.—Epidermis from skin of thigh (Sp. 12): dopa preparation. Contrast with Figs. 1, 3, and 4: melanocytes are relatively sparse and the epidermal pattern much less boldly defined. (×95.)

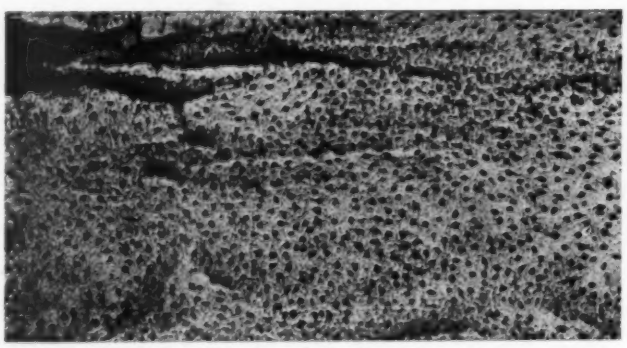


FIG. 3.—Epidermis from the cheek (Sp. 29): dopa preparation. Note the abundance of melanocytes. (×95.)

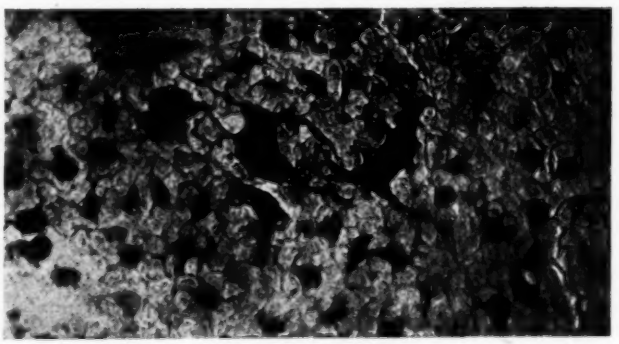


FIG. 4.—Epidermis from skin of cheek (Sp. 45): dopa preparation counterstained with paracarmine, showing dimorphism of melanocytes into large, multiple-branched, and small forms. (×390.)

FIG. 1.—Fracture surface of metal rod. (×8.) Oblique illumination.

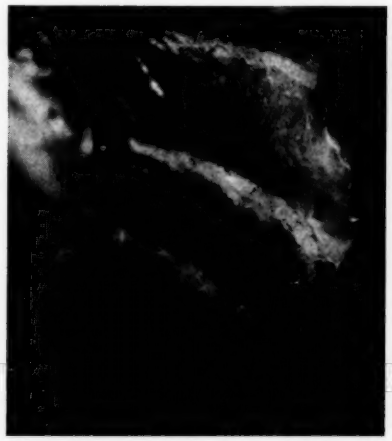


FIG. 2.—Transverse section of fractured part of stem which failed in fatigue. Note grooves acting as stress raisers. (×10.)

FIG. 3.—Longitudinal section of stem of new prosthesis illustrating depth of crazing. Fragments of polymethyl methacrylate 1–2 mm. in thickness adhering to metal rod. (×15.)

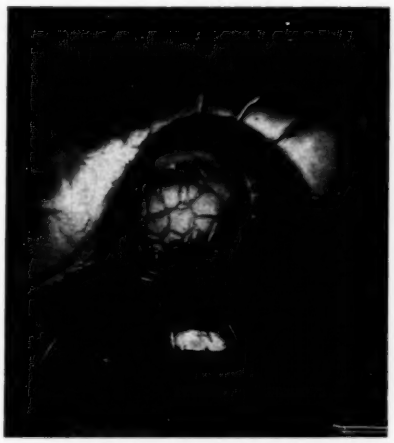


FIG. 4.—Metal rod seen through head of prosthesis, showing crazing. (×10.)

FIG. 5.—Surface of metal rod showing corrosion pits. Prosthesis of which this rod was a part was in body for 18 months. (×11.)

FIG. 6.—Case 1. (March 30, 1953.) Rarefaction of inferior cervical margin with enlargement of track resulting in shift of fulcrum laterally.

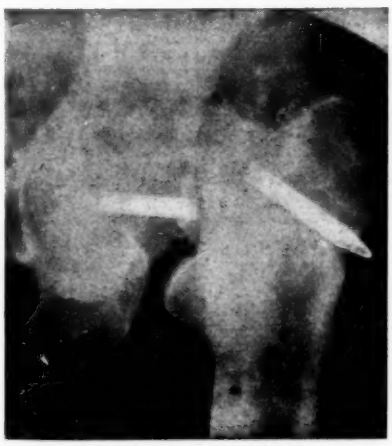


FIG. 7.—Case 1. (May 4, 1953.) Fracture of stem of prosthesis and of bone inferiorly.

FIG. 8.—Case 2. (July 21, 1952.) Excessive varus insertion of prosthesis. Note short metal reinforcing rod.

FIG. 9.—Case 2. (October 30, 1952.) Widening of track.

FIG. 10.—Case 2. (December 1, 1952.) Following insertion of second prosthesis with extended head. Length of neck further reduced.

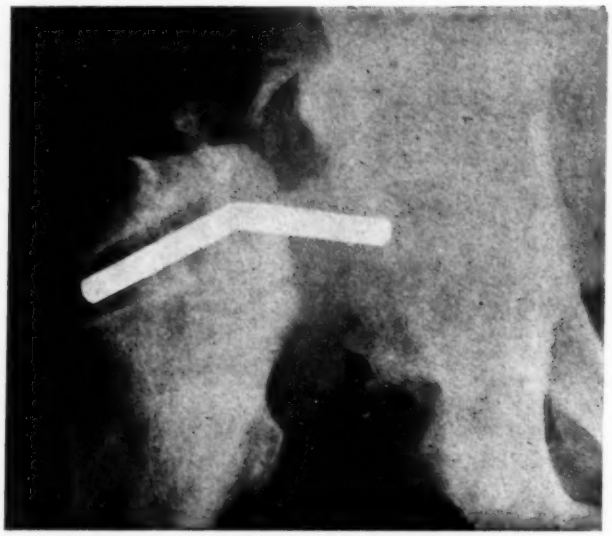


FIG. 11.—Case 2. (February 16, 1953.) Shows fracture of stem at theoretical position.

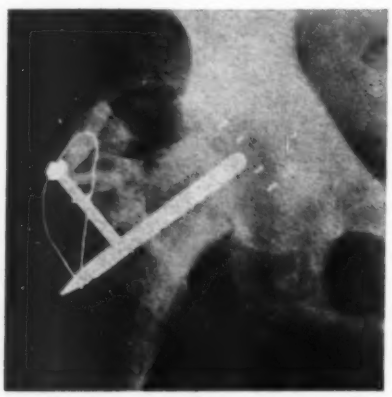


FIG. 12.—Case 3. (September 26, 1952.) Five weeks after insertion of prosthesis. Appearance of avascular necrosis of superior medial portion of neck. No widening of track.

FIG. 13.—Case 3. (May 21, 1953.) 29 weeks later. Great trochanter not united. Absorption of femoral neck and widening of track with shift of fulcrum to region of fracture of stem.

FIG. 14.—Case 4. (July 30, 1951.) Prosthesis does not penetrate lateral cortex.

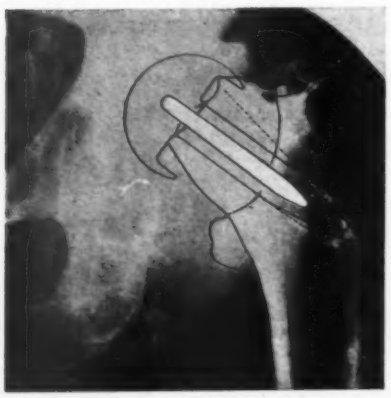


FIG. 15.—Case 4. (November 17, 1952.) 68 weeks post-operative. Widening of track. Superimposed outline shows skirt must have impinged upon superior margin of neck of femur. Fracture of skirt has probably occurred, giving rise to pain and limitation of movement.

FIG. 16.—Case 4. (March 25, 1953.) 18 weeks later. Further widening of track with fracture of inferior part of neck of femur. There is reorientation of trabeculae in relation to distal end of stem.

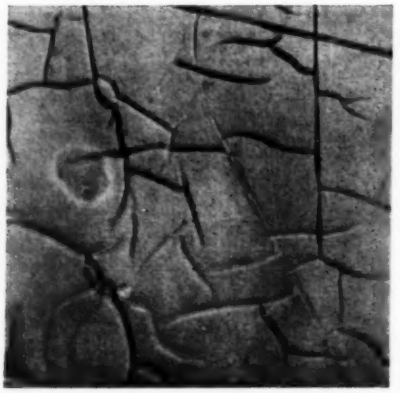


FIG. 17.—Judet prosthesis after 21 months in the body, showing crazing of unworn area of the surface of the head. (×100.)

front of the head was about to burst. Photophobia usually accompanied this violent headache and lasted often for four to five days.

Muscular Pains.—These nearly always first occurred two to four days after the swelling of the eyes, and varied considerably from case to case, but the intensity of muscular pain did not seem to depend upon the severity of the case. Patients found it unusually difficult to describe the type of pain which they experienced; the most commonly used descriptions were those of a "stiffness type of pain" or of a "heavy dull pain," and many patients reported that their pains increased on movement, especially on moving a muscle after rest, although when the muscle was further exercised the pain became less apparent and often disappeared. In this way patients themselves noticed that their muscular pains were similar to those felt in muscles following unusual exercise, such as the pains experienced by any athlete at the beginning of a new season of sport. Muscular pains have not been the predominating symptom of most patients, although they were very acute in a minority. In most persons the severe headache usually developed before the muscular pains, and was more troublesome.

Insomnia.—At the start of their illness 46 patients (56.1%) suffered from marked insomnia. This finding was commented upon by patients and relatives who, having noticed that the patient was very lethargic and found concentration difficult, were surprised at the difficulty in sleeping. This insomnia has been a characteristic of so many patients that it has suggested a useful additional diagnostic sign, for, in most persons, the insomnia could not be explained satisfactorily by the symptoms, and represented an obvious feature of its own.

At the end of the first week of illness, the swelling of the eyes had largely disappeared and the picture in most cases was that of a persisting pyrexia, with some muscle pains and marked lethargy and weakness, and this condition usually then slowly improved until after two to three weeks the patient was free from symptoms although still feeling very weak.

Splinter Haemorrhages.—Splinter haemorrhages under the finger-nails as described by Sheldon (1941) were seen in eight cases (9.8%). In all instances these haemorrhages developed late in the disease (second and third weeks) and therefore were of no value in early diagnosis. Characteristically, the haemorrhages occurred under the tips of the nails (see Fig. B), and in all but one patient they occurred under all the finger-nails.

FIG. B.—Splinter haemorrhages under nails.

Eosinophilia.—Apart from four persons, in all of whom larvae were demonstrated by muscle biopsy, an eosinophilia was present in all cases, varying from 550 to 12,000 eosinophils per c.mm.

Other Signs and Symptoms.—Constipation was reported in 29 cases (35.4%), and was a much commoner finding than diarrhoea (7 cases, 8.5%). Vomiting occurred in 24 patients (29.5%), and was usually of short duration, being most commonly reported on the first and second days of the illness. Lethargy was a very obvious feature of 26 cases (31.7%), although a much larger number reported that they felt tired and washed out. Neck stiffness was reported in 26 persons (31.7%), and included in roughly equal proportions a stiffness when moving the head antero-posteriorly and from side to side.

Complications in Central Nervous System

In five patients (6.1%) obvious abnormal central nervous system signs developed. In four these began at the end of the first week of illness and in the other at the end of the second week. One patient developed signs of cerebellar involvement and later a monoplegia; another quickly lapsed into coma, adopting a meningeal position and cry. A further case developed a wrist-drop. Two additional patients lapsed into a semicomatose state and remained critically ill for one to two weeks—one of these also developed a monoplegia. In the five cases with C.N.S. involvement lumbar puncture showed no abnormality.

Nine cases showed minor psychic disturbances, with either delusions or an obvious personality change; these findings resulted in one family considering seeking psychiatric advice, while three patients confessed that they thought they must be going mad. The personality changes mainly took the form of the patient behaving in an unusual manner. One sang constantly; another climbed out of bed and calmly urinated on the floor. Hallucinations and visual disturbances were not reported.

Disturbances of balance mainly associated with dizziness occurred in 23 cases (28.0%). This was not a troublesome symptom and usually cleared up within a few days.

Cardiac Complications (Including Details of a Fatal Case)

In the whole series there was one fatal case (see below). Another patient died from a pulmonary embolism during the third week of the disease.

Report of Fatal Case.—A man aged 45 began his attack on November 3 with sudden swelling of the eyes; frontal headache developed a day later. The initial part of his illness lasted one week, at the end of which he began to suffer from cramp-like pains in the back of his neck. At this stage his family had become extremely worried on account of his unusual behaviour. On November 17 he noticed that his right hand felt very heavy and that he was unable to lift it up.

He was admitted to hospital on November 20, and on examination was found to have a right wrist-drop, but, with the exception of a doubtful positive Babinski sign, no additional abnormalities were found in his central nervous system. Lumbar puncture findings were normal. He had a low-grade pyrexia, and on November 21 a blood count showed an eosinophilia of 3,800 cells per c.mm. He was treated with cortisone, 100 mg. daily, beginning on November 21. By the 23rd an obvious improvement in the condition of his right hand was noticeable as well as in his general condition. Next day he felt further improved, had breakfast, but, on sitting up, suddenly collapsed and died within a few moments.

At necropsy, no abnormality was found on naked-eye examination in any organ except the heart, which showed moderate left ventricular hypertrophy. Patchy atheroma was present in the coronary arteries, but complete occlusion was not found.

Histological examination of the heart showed a widespread focal destruction of the muscle fibres with an acute inflammatory reaction, the cells consisting of polymorphonuclear leucocytes with a high proportion of eosinophils (Plate, Figs. 1 and 2). The foci varied in size, some consisting of small clusters of inflammatory cells, others being about 1 mm. in diameter. The foci seemed to be of different ages, the youngest being at the stage of cellular infiltration, the oldest showing the changes of early organization. No parasites were found in any of these foci, nor were masses of foreign material seen which might have been the remnants of partially absorbed parasites.

Sections of the voluntary muscle of a limb showed a much more marked eosinophilic and polymorphonuclear leucocytic infiltration, but no focal areas of necrosis were found such as occurred in the cardiac muscle. In contrast, the cells were widely scattered between the individual muscle fibres and separated them. Larvae were found in fusiform gaps between muscle fibres which contained an inflammatory reaction at both ends. No cysts had formed. Neither parasites nor tissue reactions were found in sections in any other organ, including the brain.

The absence of any abnormal macroscopic signs at necropsy to account for this patient's sudden death suggested that he might have died from a sudden failure of the heart similar to that seen occasionally in diphtheria, and the subsequent microscopical findings supported this theory. Consequently a very careful watch was kept for any other patients developing signs late in their illness suggestive of a possible heart failure.

Three cases of sudden unexplained breathlessness beginning at the end of the third week of illness were traced.

All these patients had an obvious breathlessness and one had oedema of the legs, but there was no venous congestion in any of them and all had a regular rhythm of the heart. All did, however, show some tachycardia of 110–120 a minute. Unfortunately, further detailed examinations, including E.C.G. tests, were not carried out.

When the findings of these cases are considered in conjunction with the microscopical findings in the heart muscle of the fatal case, it seems suggestive that unexpected cardiac failure may occur in trichinosis as a late complication, especially towards the end of the third week of the disease. Certainly any unexplained fainting or breathlessness at this stage of the illness, particularly if associated with tachycardia or a low blood pressure, should be taken seriously and the patient nursed in the recumbent position.

It is interesting to consider the possible causation of the myocarditis in the fatal case, which occurred two to three weeks after the first larvae had migrated from the bowel. As no larvae were found in the heart muscle it is unlikely to be a direct reaction to their continued presence. It is usually believed that the larvae encyst mainly in the muscles with a high metabolic rate, such as the oesophageal muscle, diaphragm, and the intercostal muscles. The fate of other larvae in the rest of the body—and there must be a very large number of them—is unknown. By analogy with experimental animal infections with trichinellae, destruction of the larvae in muscles of low metabolic rate would occur from the second week onwards. This raises the possibility that the myocarditis occurred at the time of larvae destruction in the heart muscle and may have been due to the products of destruction.

Sequelae

Fifty-two of the cases were followed up by health visitors four to six weeks after their illness. Only 15 of these patients reported that they felt fully recovered. The majority complained of tiredness and lack of energy, and 24 had not returned to work. Nine of the group had some transient breathlessness which lasted a few days, developing in every case from the third to fifth week. Further visits were paid to all patients still showing some symptoms, and at the time of writing this report 16 were still being visited. The general picture is of an exhausting debilitating disease from which recovery is very slow.

Laboratory Investigations

The methods used in examining the muscle are described in detail, since it is only by this means that the diagnosis can be established with certainty in a suspected clinical infection. A piece of muscle about 2 c.cm. in size was removed under local or general anaesthesia from the deltoid or the outer aspect of the thigh, or wherever local symptoms suggested, with due regard to cosmetic results. A small flat disk about 5 mm. in diameter, with the muscle fibres running along the surface, was pressed between two glass slides until it was about 2 cm. in diameter, and examined unstained under the low power of the microscope. Coiled larvae were usually seen clearly, but the smaller earlier stages, which have less well-defined morphological features and which lie along the axis of the muscle fibres, were seen only with difficulty. In a heavily infected case a larva was usually found in a few minutes, but in others half an hour or an hour was spent before one was found. As will be seen from Table IV in seven cases no larvae were found by direct examination, though they were found in a digest.

Digestion of the muscles was done in all cases. A weighed quantity about 2–5 g. was cut into small fragments and incubated overnight in 250 ml. of 1% acid pepsin, then centrifuged and a little formol saline added to the deposit. The fixed deposit was examined in a "perspex" cell 4 cm. by 3 cm. by 3 mm. on a inverted microscope. Since the larvae are much heavier than the debris, they can be seen clearly as refractile objects with definite morphological characteristics lying on the bottom of the cell against the vague background of the debris (Plate, Figs. 3, 4, 5, and 6).

TABLE IV.—*Results of Muscle Biopsy*

Patient	Direct Film	Digestion	Larvae per g. of Muscle	Nature of Illness
1	Larvae present	15 larvae in 2 g. muscle	7·5	Moderate
2	Nil	40 " " 2 " "	20	"
3	Larvae present	12 " " 3·5 " "	3·4	"
4	" "	58 " " 1·2 " "	48·3	"
5	" "	19 " " 1·3 " "	14·6	Severe
6	Nil	66 " " 2 " "	33	"
7	"	6 " " 5·3 " "	1·1	Moderate
8	Larvae present	511 " " 4·3 " "	118·6	Severe
9	Nil	1 larva in 1·6 " "	<1	Mild
10	Larvae present	23 larvae in 1·4 " "	16·4	Moderate
11	" "	1 larva in 1·19 " "	<1	"
12	Nil	1 " 1·5 " "	<1	"
13	"	1 " 1·6 " "	<1	"
14	Larvae present	131 larvae in 1·6 " "	81·8	Severe (died
15	Nil	2 " " 3·62 " "	<1	Moderate
16	Larvae present	64 " " 3·01 " "	21·3	"

Summary

An outbreak of trichinosis is described which occurred in Liverpool in the late autumn of 1953 and involved 82 persons.

Infection was traced to sausages in most cases. In two instances pork roasted at home was responsible. Although epidemiological investigation traced the infection to a particular carcass of pork, it was impossible to trace this finding back to a piggery, as no records existed to enable this to be done. There is an obvious need for such records to be kept by the Ministry of Food.

Women were affected more often than men (60 to 22). Analysis of the eating habits of 3,412 housewives in Liverpool showed that 16.1% habitually ate raw sausage.

The symptomatology of 82 cases is considered in detail. Oedema of eyelids, headache, muscular pains, pyrexia, photophobia, and insomnia were the most commonly reported signs and symptoms.

A fatal case is recorded, together with the post-mortem findings. The complication of myocarditis developing in the second and third weeks of disease is considered, and it is emphasized that any suggestion of cardiac involvement should be treated seriously and the patient nursed in a recumbent position, as there is a possibility of sudden death.

Larvae were isolated from the muscles of 16 patients.

Thanks are due to the many general practitioners and consultants, hospital staff, and our public health colleagues in neighbouring districts who, by their whole-hearted co-operation, made this epidemiological and clinical study possible.

We are indebted to Professor B. G. Maegraith, Dean of the Liverpool School of Tropical Medicine, for his assistance with the photographs and to Mr. J. Brady for taking them.

REFERENCES

Anderson, G. W., and Arnstein, M. G. (1953). *Communicable Disease Control*, p. 213. Macmillan, New York.
Evans, A. D., and Lennox, M. (1953). *British Medical Journal*, **2**, 131.
Jolly, R. H. H. (1941). *Publ. Hlth, Lond.*, **54**, 88.
Sheldon, J. H. (1941). *Lancet*, **1**, 203.
Young, M. R. (1947). *J. Helminth.*, **22**, 49.

The Welsh National School of Medicine has received covenants from some firms interested in anaesthetics and anaesthetic apparatus guaranteeing for seven years annual grants of £700 to aid research in the department of anaesthetics.

BIOMECHANICAL PROBLEMS OF THE ORIGINAL JUDET PROSTHESIS

BY

JOHN T. SCALES, M.R.C.S., L.R.C.P.

Medical Officer i/c Plastics Research Unit; Senior Lecturer, Institute of Orthopaedics (University of London); Honorary Senior Registrar, Royal National Orthopaedic Hospital, London

AND

J. M. ZAREK, Ph.D., B.Sc., A.M.I.Mech.E.

Lecturer in Mechanical Engineering, King's College (University of London), London

[WITH SPECIAL PLATE]

In the treatment of pathological conditions of the hip-joint much surgical ingenuity has been exercised in the development of various types of arthroplasty. Recently the Judet technique seemed to offer a considerable prospect of success, and indeed the preliminary results published by J. and R. Judet (1950) were encouraging. The results achieved in this country, however, have been less satisfactory than those claimed by the Judets in 1952. In their later report they state that "fracture of the stem of the prosthesis has not occurred in 500 operations since the stem of the prosthesis has been reinforced with a steel core. Undue wear of the surface of the head has occurred in three cases, and we are seeking its cause."

In view of the number of breakages and instances of wear of prostheses manufactured in this country, however, it was decided to investigate the reasons for these mechanical failures. The work has been made possible only by the generous co-operation of a number of orthopaedic surgeons. Our investigations suggest that both the design of the prosthesis and the combination of materials used in this country are unsatisfactory.

It seems that delayed failures of the operation are commonly attributable to one or more of the following: (1) failure of the materials; (2) malposition of the prosthesis; (3) interference with the local blood supply to the bone.

Before giving examples of causes of failure it is important to consider the mechanics of the hip-joint, the materials used in the prosthesis, the design, the method of manufacture, and the blood supply of the neck of the femur.

Mechanics of the Hip-joint

In a person standing erect with both feet together the weight of the head, arms, and trunk is distributed equally between both hip-joints. For example, assuming the total weight of the patient to be 70 kg., and the weight of each lower limb 15 kg., there will be 20 kg. carried by each femoral head, with the body weight acting vertically downwards in a sagittal plane. If now the patient stands on one leg, keeping the pelvis horizontal, the hip-joint becomes the fulcrum of a lever (Fig. A). The weight of the body carried by the supporting hip-joint becomes 40 kg. for head, arms, and trunk, plus 15 kg. for the non-weight-bearing limb. Because the femoral head represents a fulcrum of a lever, the total moment about this point which has to be resisted by the contraction of the glutei, tensor fasciae latae, etc., can be calculated as follows from Fig. A:

Assuming that the distance OW from the symphysis pubis to the centre of the area of contact of the femoral head with the acetabulum is 10 cm., then the moment due to the weight of the head, upper limbs, and trunk is 40 kg. × 10 cm. = 400 kg.cm. The moment due to the non-weight-bearing limb is 15 kg. × 20 cm. = 300 kg.cm. The total moment is therefore 700 kg.cm.

Assuming that the resultant force due to muscle pull acts on the great trochanter at a distance OQ of 5 cm. from the centre of the femoral head and at an angle of 45 degrees, then, from the consideration of moments, Q = 140 kg., and the vertical reactive force (R_1) is equivalent to 140+40+15 kg. = 195 kg.

From a consideration of statics the total reactive force carried by the head is equal to 240 kg. (R) and acts at 36 degrees to the vertical. Therefore the angle between the axis of the prosthesis in the bull's-eye position and the direction of the force transmitted by this joint is 12 degrees. As in the process of obtaining this result a certain number of assumptions had to be made, the results will vary from patient to patient, but they give an indication of the magnitude and direction of the acting forces under static conditions.

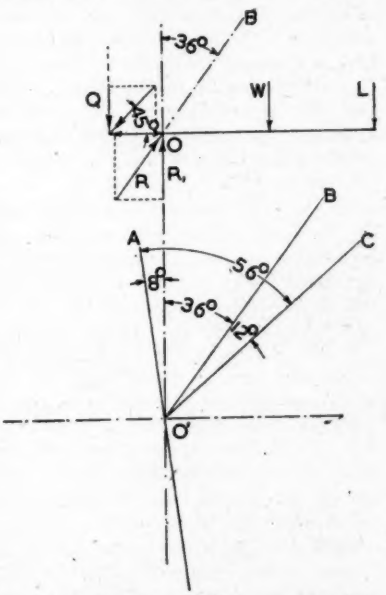


FIG. A.—Patient standing on one leg, assuming pelvis horizontal. W = 40 kg. L = pendant limb = 15 kg. O = fulcrum of joint. O'A = axis of femur. O'B = direction of resultant force transmitted through joint. O'C = axis of neck of femur and prosthesis when inserted in bull's-eye position.

When the patient is walking, accelerating and retarding forces come into operation and, according to their magnitude, may produce a load on the joint which will exceed the static value. At times the line of body weight may move further from the hip-joint, and this will also increase the load carried by the joint. Under shock load conditions, as when a patient accidentally steps off a kerb, the instantaneous loading value will be even greater. Considerable work on the mechanics of the hip-joint has been done by Ros y Codorniu (1949), by Osborne and Fahrni (1950), and by Endler (1953b).

Materials, Design, and Method of Manufacture

Materials.—The development of organic synthetic materials has resulted in a range of materials which appear suitable for use in contact with body tissues. Any material to be used inside a joint must fulfil certain requirements (Scales, 1951). It should be chemically inert, physically unaffected by tissue fluids, incapable of provoking an inflammatory or foreign-body response in the tissues, non-carcinogenic, incapable of producing a state of allergy or hypersensitivity, capable of standing up to the mechanical strains imposed upon it, and capable of being fabricated simply into the form required. Because polymethyl methacrylate satisfies most

of these requirements, the Judets, in 1946, used it for their reconstructive procedure. In this country the material used is unplasticized polymethyl methacrylate produced by Imperial Chemical Industries, Ltd., under the trade name "perspex." The mechanical properties of thermoplastics are a function of temperature, and it may be taken that the following values for perspex apply at 37° C.: maximum tensile stress, 490 kg./cm.²; modulus of elasticity, 2.625×10^4 kg./cm.²; Vickers pyramid hardness, 15–18. The linear coefficient of thermal expansion at 37° C. is 9.7×10^{-5} per °C.*

Design.—The standard Judet acrylic prosthesis used in this country up to the time of writing is a "mushroom-like" structure. Various stem lengths and head diameters are available. The head is approximately two-thirds of a sphere and is recessed to take the shaped basal part of the head and adjacent neck of the femur. The grooves on the stem and the squared taper are devices to prevent rotation, and vary according to the manufacturer. The stem is reinforced with a metal rod which is totally enclosed by the resin.

Method of Manufacture.—The shape of the prosthesis having been turned from the solid block, a hole of slightly less diameter than the metal rod is drilled up the stem into the head. The method of insertion of the rod depends on the ideas of the manufacturer. The hole is filled with a solvent or cement in order to soften the surrounding acrylic locally, thus allowing a metal rod to be forced into the cavity—a type of "shrinking" fit being obtained. A perspex plug is next inserted to fill the remainder of the hole, and the tapered end of the stem is subsequently fashioned. The coefficient of expansion of polymethyl methacrylate is eight times that of steel, and consequently the bond between the acrylic and the metal rod is subject to disturbance when the temperature of the prosthesis is raised either during sterilization by heat or, to a less extent, when it is placed in the body after formalin sterilization. For greatest reinforcement of a structure there must be, of course, adequate bonding between the two materials used, and a sufficient anchorage. We have found that in a number of cases the reinforcing rod had such a loose fit that it rattled. One manufacturer drilled a hole through the metal rod; the acrylic cement filled this hole and thus prevented the rod from rattling.

Biomechanical Analysis of the Design.—The design of the prosthesis should be such that: (1) it is strong enough to transmit the forces due to body weight and the action of the gluteal muscles to the shaft of the femur, without danger of mechanical failure; (2) it can distribute the load on the femur as uniformly as possible without endangering the blood supply and without producing local crushing of the bone; (3) the dimensions of the head will give greatest loading area with least limitation of movement of the femur.

Theoretical Considerations

Fig. B shows a prosthesis with a stem correctly penetrating the cortex; it rests on an area represented by the point B_1, where the bone may be either cancellous or cortical or both. The resultant action of the weight of the body and the action of muscles is represented by force P acting medially to B. This force can be resolved into two components, P_1 and P_2. Thus the prosthesis is subjected to bending and shearing due to P_1 and direct stress in the direction of the stem due to P_2. Torsional stresses should be negligible. Owing to the penetration of the cortex the direct stresses due to the component P_2 are taken up by the annular part of the prosthesis under the skirt. The stem will thus be subject only to bending and shearing stresses due to P_1 as indicated diagrammatically by I and II in Fig. B.

As the angle i increases, the component in bending P_1 also increases, since $P_1 = P \sin \alpha$, the angle α being directly proportional to angle i. The moment about B thus increases, since it is a product of $P_1 \times AB$.

Should AB increase because of the movement of the point of support laterally, as occurs with absorption of the cancellous bone or fracture of the inferior cervical cortex, then there will be a further increase in the value of the moment about B_1 (Fig. C). This distance AB is necessarily large when a prosthesis with an extended head is used. As the value of the bending moment increases, so the value of R_1 must also increase. There are thus three situations which may arise: (1) a state of equilibrium of the structure is reached; (2) the flexural strength of the stem of the prosthesis is exceeded and failure occurs; and (3) fracture of the bone takes place.

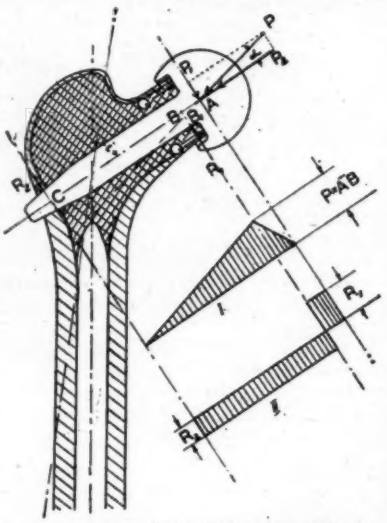


FIG. B.—Prosthesis in bull's-eye position. I = Bending moment diagram. II = Shearing force diagram.

When the stem does not penetrate but abuts against the lateral cortex, or where there is incomplete penetration of the cortex by the taper of the stem and the annular part of the prosthesis is not in contact with the transected neck, then direct stress will be additionally introduced in the stem. Should the stem not be long enough to reach the cortex, the direct stress will again be taken up by the annular surface, but the prosthesis will undoubtedly be in a less stable equilibrium.

When comparing the loading of the neck of a normal femur with that in which a Judet prosthesis has been inserted, it is clear that the distribution of load through the prosthesis is far from favourable. As seen in Figs. B and C, the reactive force R_1, which may be either local at B_1, or distributed along a greater or lesser extent of the lower surface of the stem, may be excessive; nor does its direction of action correspond with the normal anatomical "lines of force" in the region of the calcar femorale.

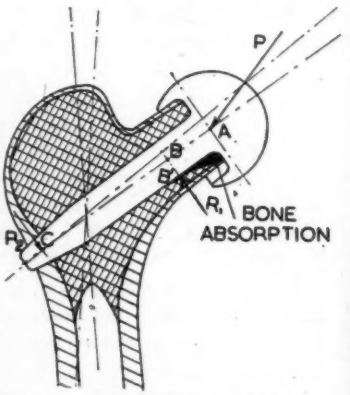


FIG. C.—Shift of fulcrum B_1 due to absorption.

As the ratio of the modulus of elasticity of stainless steel to that of polymethyl methacrylate is as high as 86:1, full advantage of the metal insertion can be achieved only if adequate anchorage of the reinforcing rod is provided and the bonding stress between the two materials is high enough to ensure that no movement between the plastic and the metal insert takes place during straining. If the bond is poor or the insert is actually loose, then failure of the plastic part of the stem will take place under a very low load.

Experimental Findings

Preliminary tests on the prosthesis under static load were carried out. A prosthesis of the Judet type but without a metal reinforcement, fitted into a femur, failed under a vertically applied load of 470 kg., giving a failing stress in bending in the stem of 490 kg./cm.² This result agreed with the one obtained by Endler (1953a).

In order to test prostheses reinforced with steel, a metal reproduction of the femur was made. The failing stresses

*Values as given by Imperial Chemical Industries.

for the plastic part of the stem of a number of tested prostheses were in the range of 420–560 kg./cm.²

If the prosthesis is correctly fitted the forces involved during normal movement of a patient produce much lower stresses in the stem, but nevertheless cause failure. It was evident that other factors such as fatigue of the materials and stress corrosion must be responsible. Examination of a number of prostheses which had failed in the body confirmed this belief. The results of a typical metallurgical investigation are given below.

The metal pin under investigation was part of a prosthesis which failed in service after insertion. It was supposed to be made from austenitic stainless steel of the 18% chromium and 8% nickel variety, but when reference was made to the makers no indication of the exact type or condition of the steel could be obtained. Examination of the surface of the pin showed that it was badly polished, having the appearance of a "filed" type of finish. The fractured surface (Plate, Fig. 1) of the rod consisted of two parts: first, a fairly smooth area marked with a series of concentric rings, the centre of which was a point on the periphery of the pin; and, secondly, an area with a fine-grained "crystalline" type of fracture. These findings are typical of a fatigue failure.

In order to examine the micro-structure of the rod, a longitudinal section was polished and examined in the unetched condition. The following observations were made: no sign of cracking was noticed either immediately adjacent to the fracture, or anywhere on the specimen; and the steel did not contain any non-metallic inclusions, or any other signs of defects.

Subsequently the specimen was etched in Murakami's reagent to examine for carbides, and the following observations were made: the structure now showed a number of black particles and pits; these particles appeared to be parallel to the direction of the working of the pin; no other structure was visible.

It was considered that free carbides were present in the material. Finally, the specimen was repolished and etched in aqua regia and the following observations were made: (*a*) The general structure was typical of an 18/8 austenitic stainless steel. (*b*) The structure again showed the presence of particles elongated by working, which were assumed to be carbides; another constituent, the nature of which was not established, was probably free chromiferrous ferrite. (*c*) There was no plastic deformation of the surface of the grains over the fractured surface, or any signs of defects.

The hardness of the steel was of the order of 230 Brinell, which is equivalent to a tensile strength of 7,560 kg./cm.² and represents a nominal figure for this type of steel. In conclusion it may be said of the fracture that: (*a*) It is a fatigue fracture. (*b*) It may have been due to either too low a fatigue limit of the material used or a lowering of the fatigue limit by structural or corrosive effects. (*c*) The material, although an 18/8 stainless steel, shows in its microstructure the presence of a certain amount of included material. These inclusions, unusual in this type of steel, may consist of free ferrite or free carbide, and could act as stress raisers and thus seriously reduce the fatigue strength of the steel. (*d*) The presence of these constituents in the structure would seriously reduce the corrosive resistance of the steel, and only a slight corrosion of the pin would be sufficient to reduce the fatigue strength even further. No evidence of corrosion was found in the specimens, but it should be noted that corrosion effects are rarely seen in stainless steels when failure occurs by corrosion fatigue.

Polymethyl methacrylate, according to the makers' tests, loses 50% of its strength when subjected to a constant load well below its breaking strength for about 1,000 hours at 20° C. (Hoff, 1952). Its ultimate static strength also depends on the straining rate (Maxwell and Harrington, 1952). Fluid absorption, which according to the makers may reach 2%, will also have some effect on its mechanical properties.

When a material is subject to cyclic stressing well below the value of the static failing stress, a progressive deterioration of its strength takes place and may finally result in failure. For the investigation of the behaviour of metals suitable methods of testing have been developed, resulting in reliable information.

It is realized that the characteristics of metals and plastics differ widely. As there are no suitable methods of fatigue testing for plastic materials, we have adopted the well-established method used in the investigation of metals, which, we believe, should give an approximately correct result.

Specimens of perspex made from rods as supplied by the makers were fatigued in flexure with full reversal of stresses at 2,000 cycles a minute. Curve A in Fig. D shows that the stress fatigue limit is in the range of 110 kg./cm.²

As it is a customary procedure to sterilize the prosthesis by boiling, a series of tests were performed as for Curve A, but, before testing, the specimens were boiled for 30 minutes and then plunged into cold water. It is evident from

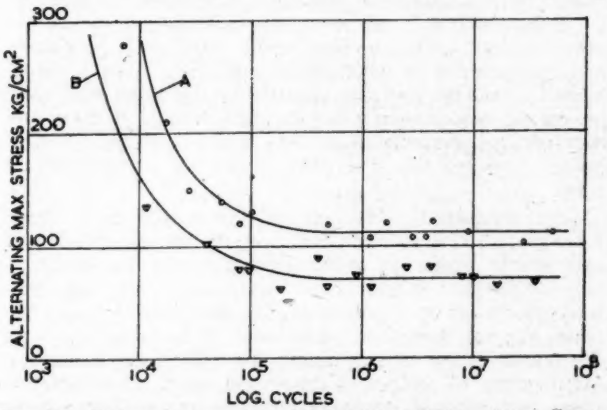


FIG. D.—Fatigue test results on polymethyl methacrylate. Curve A = material as supplied by the makers. Curve B = test specimen, boiled and cooled before testing.

Curve B (Fig. D) that this procedure has reduced the fatigue limit to approximately 70 kg./cm.² The same degree of reduction in strength was observed when, after boiling, the specimen was allowed to cool very slowly.

From these tests the following comments can be made: (1) The fatigue strength of polymethyl methacrylate when subjected to rapidly fluctuating stresses is from 15% to 25% of its ultimate strength. In both tests the results indicate a high degree of scatter which may, in part, be attributed to poor heat conductivity of the material and high hysteresis losses. (3) The decrease of strength of the material after boiling may be due to water absorption or to an alteration in the structure of the polymer. (4) In application to the human body the frequency of 30 cycles per minute may be accepted as around normal and therefore a certain percentage of strain recovery is possible.

Fig. E shows results of fatigue tests in flexure on prostheses with a 6.3 mm. stainless-steel reinforcing rod. In

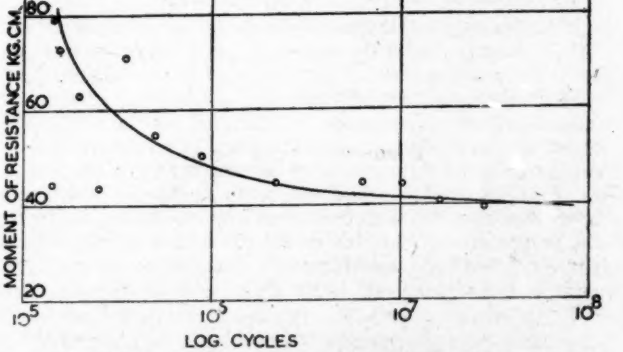


FIG. E.—Fatigue tests in flexure on prosthesis with a 6.3-mm. diameter metal reinforcing rod.

two cases the plastic and the rod failed simultaneously. In all others the plastic part of the stem failed and slipped off the metal rod. The tests suggest that the value of the moment of resistance of 41 kg.cm. may be accepted as a fairly safe limit. From simple calculations, assuming the force transmitted by the joint to be 240 kg. and the angle of insertion i to be 56 degrees, it is found that in the human body the above moment of resistance will be exceeded only if the point of application A of

load P (Fig. B) is further than 8.2 mm. from the point of support B. This figure was obtained using the experimentally determined safe value for stress in the plastic part of a stem with a 6.3 mm. reinforcing rod. Again, simple calculations indicate that if an 8.0 mm. steel rod were used the critical value for the distance AB would be about 18 mm.

This critical condition could be satisfied with much greater ease if the 0.67 sphere of the Judet head could be replaced by a hemisphere. All these calculations are based on experimental results obtained under laboratory conditions with a frequency of 2,000 cycles a minute. It is realized, however, that the carrying capacity of the Judet stem may be greater under actual working conditions, because the less frequent straining may allow strain recovery. Nevertheless it seems that the distance AB should not exceed 2 cm.

The average failing strength of the prostheses in which both the steel reinforcing rod and the acrylic failed was appreciably higher than that in which the acrylic alone failed. The two different types of failure of the stem may be explained in terms of anchorage and bonding stress between the acrylic and the metal rod. The better the bond the higher is the fatigue failing strength of the prosthesis. Sterilization by boiling disturbs the bond, and therefore other methods not involving a rise in temperature should be used. Qualitative analysis of bonding stresses in a great number of prostheses, by means of the photo-elastic method, indicated that the bonding stress between the acrylic and the metal rod of an initially good prosthesis was reduced considerably in the process of boiling. Immediately after boiling, residual thermal stresses were present in the head of the prosthesis, causing high stress concentration at the point of junction of the stem and the head. These decreased slowly, disappearing in about two hours.

A prosthesis in a state of stress will be more vulnerable to impact, which may cause failures during insertion.

The grooves in the stem vary in length, depth, shape, and surface finish. When a structure is subjected to cyclic stresses it is of the utmost importance that a perfect polished-surface finish should be obtained, as a rough finish is a source of stress raisers (Plate, Fig. 2).

Examination of new prostheses which failed in fatigue under laboratory conditions revealed a brown deposit on the inner wall of the acrylic stem and the surface of the reinforcing rod. A chemical analysis indicated that this was iron oxide, and the quantity formed was directly related to the magnitude of the stress in the metal rod, the deposit being greatest at the point of maximum bending moment.

It is known that materials which in an unstressed condition show no signs of corrosion may behave differently when in a stressed condition. In engineering practice the term "corrosion fatigue" is used to describe the simultaneous action of corrosion and fatigue. It has also been found that corrosion which takes place in a material before subjection to cyclic stress has a far less damaging effect than a slight corrosion taking place simultaneously with the applied stresses. It is thus of great importance to investigate the behaviour of materials under the action of body fluids and the chemical constituents of the resins and solvents, both in the stressed and in the unstressed condition.

In an effort to overcome the shortcomings of the Judet prosthesis, some surgeons have resorted to the use of stainless steel or vitallium prostheses. It is only in recent years that materials have been used in orthopaedics in situations where they will be subjected to constant fatigue stresses in contact with tissue fluids. Most metal appliances have been used for temporary fixation of fractures and have rarely been exposed to prolonged fatigue stresses once union of the fracture has occurred. A metal prosthesis may initially have a better load-carrying capacity, but the problem of stress corrosion remains.

Polymethyl methacrylate is also subject to crazing (Russell, 1948; Sauer and Hsiao, 1953) which is defined as fine mechanical cracking over the surface of the material, penetrating to a depth which depends on the intensity of the cause. It may be brought about by the simple or compound action of such factors as mechanical stressing, solvents, and high energy radiation. Only the first two factors, however, are significant. It has been found that only tensile stresses produce crazing, the direction of cracks taking place at right angles to the direction of action of the tensile stress. The intensity depends on the magnitude, rate, and duration of the stress applied, the dimensions of the specimen, and its heat treatment. Solvent crazing patterns are irregular, in contrast to the well-orientated ones produced by tensile stresses, although the physical effects are the same. Stresses due to the forced fitting of the metal rod in the presence of solvent cause crazing of the inner wall of the stem; it has been found that the penetration of crazing was considerable even before stressing the prosthesis externally (Plate, Figs. 3 and 4). It is evident that serious defects exist in the prosthesis *even before it is put into use.*

Blood Supply

The blood supply to the head and upper neck of the femur is derived from three main sources: the nutrient artery, the retinacular vessels, and the trochanteric fossa anastomosis.

The proportion of flow from each of these sources is variable from patient to patient. The retinacular vessels are arranged in three main groups (Tucker, 1949)—postero-superior; postero-inferior; anterior—which pass up beneath the synovial membrane reflection and penetrate the base of the head and upper neck through a number of foramina to anastomose with branches of vessels from the nutrient artery and trochanteric fossa. We have found that the vessels supplying the cortex of the femur originate mainly from the medullary network (J. T. Scales, unpublished observations). Any reaming of the neck to take the skirt may cause considerable damage to the retinacular vessels. The insertion of the stem of the prosthesis must further interfere with the vascularity of the bone. Revascularization is made more difficult by occlusion of parts of the neck by the skirt. It is vital that the cortex should be interfered with as little as possible and that prostheses with occlusive cuffs should not be used.

Analysis of Clinical Material: Prostheses

Thirty prostheses removed because of structural failure have been examined. In most cases the clinical notes and radiographs have been made available to us.

Of the 30 prostheses sent to us 21 were removed because of fracture of the stem. In 17 cases the site of the failure was within 2 cm. of the base of the head. This was found to coincide with the most probable position of the point of support B_1 (Fig. B)—that is, the position of the greatest bending moment. Here also the surface of the stem is interrupted by the beginning of the milled grooves. The stems of six were broken near the distal end of the rod. in the region of C. Two stems had fractured in both regions.

Coarse crazing of the surface due to the milling operation was present in all stems examined. In many cases deductions made about the position of the fulcrum B_1 and the distally situated point of reaction C on radiographs were confirmed by worn areas on the acrylic stem in the corresponding positions.

Leakage of tissue fluid around the stem plug was seen in a number of cases. This is a serious matter when the reinforcing rod is not inert.

Of the 30 broken prostheses studied the metal rod had failed in 15. In 12 cases the site of the fracture was about the mid-point of the rod, coinciding with the position of failure of the acrylic part of the stem. In three instances in which the metal rod had been drilled at its distal end failure occurred in the cross-section of the rod. In six cases the rod was intact, although the stem had fractured,

and the site of failure in these cases was either immediately adjacent to the base of the head or at the distal end of the metal rod. The rods examined were from prostheses produced by five different manufacturers. Their diameters, together with the number of failures in each category, are given in the Table. Nitric acid (S.G. 1.200) was applied to

Diameter of Metal Rods, With Number of Failures in Each Size

Diameter of Metal Rod (mm.)	No. of Rods	No. Broken
4·5–	1	1
5·0–	1	1
5·5–	19	11
6·0–	3	1
6·5–	3	1
7·0–	0	0
7·5–8·0	3	0

28 rods and a positive reaction was obtained in 11 cases, indicating that these rods were *not* stainless steel. Of the 17 that were negative to nitric acid, eight were magnetic and were therefore most probably not of the austenitic variety of steel. (Austenitic steel can become slightly magnetic during working, but usually loses this property in a short time.) Corrosion pits were visible in nine of the rods (Plate, Fig. 5), all giving a reaction to nitric acid. One manufacturer used rods of a copper-zinc-nickel alloy, which had been chromium-plated and had the appearance of stainless steel. The surface finish of most of the rods was poor. A mirror finish should be obtained, as small scratches and grooves are apt to be centres of corrosion.

In a few instances, when the acrylic stem was cut and the metal rod withdrawn, a quantity of liquid was found which smelt strongly of burnt sugar. After a few minutes the inner surface of the stem turned yellow. This phenomenon was unexplained. A number of rods were surrounded by a white powder which fluoresced under ultra-violet light. In a number of instances the surface of the polymethyl methacrylate and the metal rod were not every-

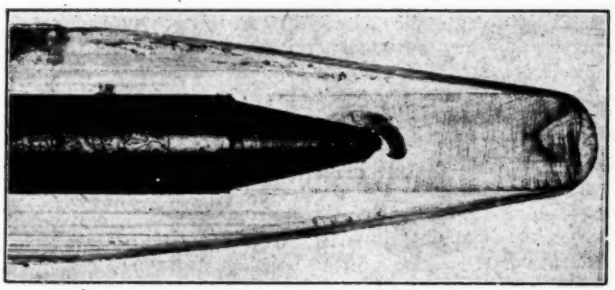


FIG. F.—Voids at metal/acrylic interface. Note also leakage around plug and crack in acrylic at pointed end of metal rod. (×3.)

where in contact (Fig. F), so there was a very poor bond between the metal and plastic. Wear of the weight-bearing area of the acrylic head was plainly visible in 12 of the 30 prostheses. The Vickers diamond test (1 kg. load at 20° C.) gave hardness numbers between 22 and 26, with one at 18, on 23 prostheses, the worn areas giving slightly higher values.

Examination of 21 heads by ultra-violet light revealed crazing of the surface (Plate, Fig. 17)—never in the worn part, but always in the surrounding area. In the nine heads showing no apparent wear, crazing could not be demonstrated, suggesting that crazing precedes wear.

It is possible that wear of the head is a cause of pain and limitation of movement in those patients in whom the prosthesis appears to be mechanically satisfactory.

The movement of any synovial joint has two components —sliding and rotation. The conditions for efficient lubrication are critical, being related to the nature of the two surfaces in contact, their relative velocities during movement, and their area of contact (MacConaill, 1950). Even if a cartilaginous acetabular roof is present initially, it is unlikely that the dimensions of any implant made in eight sizes of head and having a surface which is not congruous with the acetabulum will fulfil the critical requirements. The surface hardness of a foreign body used as a component of a joint must be such that it will not wear when in contact with bone. If local wear of the prostheses takes place, then in certain positions during movement an excess loading/unit area will result.

Our radiographic studies suggest that the load-carrying capacity of a joint is determined early in life. It is possible that one of the causes of osteoarthritis is an increase in load per unit area which the head of the femur has to carry when the weight of the patient increases in middle and later life. It is suggested that the acetabulum therefore should be reamed so as to accommodate an artificial head of abnormally large diameter, so that the load should be distributed over a greater area.

It has not been possible to correlate wear of the prosthesis with sclerosis of the roof of the acetabulum or with irregularity of its radiographic outline. It was found, however, that wear occurred when the depth of the acetabulum exceeded two-thirds of the diameter of the prosthesis, or, in other words, when the head was relatively small. Thus the femoral head selected should be as nearly congruous with the acetabular cavity as possible.

Examples of Mechanical Failure of Prostheses in Patients

In view of the many interdependent mechanical features, it is not possible to assign a simple reason for failure on radiographic evidence. It is clear from Figs. B and C, however, that where the angle of insertion i is large and where the fulcrum B_1 occurs some distance down the stem, the prosthesis is subject to a large bending moment. Both these factors may be assessed qualitatively on the radiograph. As the direction and point of application of the forces acting through the hip-joint cannot be estimated accurately, it is not possible to predict quantitatively the values of the transverse force P_1 and the direct force P_2, and the bending moment ($P_1 \times AB$). A standardized radiographic technique could be developed which would enable these values to be measured. The method would include the use of the scanogram technique.

Two main methods have been used in the examination of the available radiographs. (1) The dimensions of the radiograph shadow of the metal rod, and the metal rod of the Judet prosthesis which was removed from the patient, have been measured. From these measurements the magnification was determined for each *x*-ray film. In this manner a reproduction of the outline of the prosthesis was made from transparent cellulose acetate film. (2) The angle of insertion of the prosthesis is defined as the acute angle included between the line of the stem and the axis of the femoral shaft with the limb in the neutral position. This angle may be called the stem-shaft angle. It is, of course, realized that there are a few degrees difference in anteversion from patient to patient.

It has been found that when it was possible to measure the angle of insertion, and either the stem or the skirt, or both, were broken, *the angle of insertion always exceeded 40 degrees.* In the radiographs of nine patients in which the prosthesis was apparently satisfactory the angle of insertion was in the region of 40 degrees or less.

Case 1

This case illustrates the effect of too great an angle of insertion.

The patient, a married woman aged 65, developed osteoarthritis of the left hip after a fall four years previously. On November 12, 1952, a Judet prosthesis, 43/80, was inserted, the neck being reamed to take the skirt of the prosthesis. On January 13, 1953, she was discharged, the movements being as

follows: flexion with extended knee, 90°; flexion, 90°; extension, 10°; abduction, 15°; adduction, 10°; external rotation, 10°; internal rotation, 10°.

When seen as an out-patient on March 13 she was not complaining of any pain and could walk one mile. Fig. 6 (Special Plate) is a radiograph taken at four and a half months and shows the angle of insertion to be approximately 60 degrees. Thus from Fig. B, since $P_1 = P \sin \alpha$, the value of the transverse component is large. Also the distance AB exceeds the theoretical value of 8.2 mm.

On April 13 the patient felt a sudden snap in the left hip with pain down the leg. Radiographs showed fracture of the prosthesis (Plate, Fig. 7).

The skirt would, of necessity, be broken, because the neck of the femur is displaced upwards. Other factors such as crazing of the acrylic and the use of unsuitable metal were found to have contributed to the failure.

Case 2

This case shows the combined effect of a large angle of insertion, too short a metal reinforcing rod, and the use of an extended neck.

The patient, a man aged 59, had a five-years history of osteoarthritis of the right hip. A Judet arthroplasty was performed in May, 1952. A large cystic space was found in the posteroinferior aspect of the neck, and consequently the stem was inserted as high as possible (Plate, Fig. 8). A radiograph taken in October, 1952, showed a fracture of the acrylic part of the stem of the prosthesis near the distal end of the metal rod (Fig. 9). From the radiographs it will be seen that the stem pierced the lateral cortex, and that the fulcrum was slightly medial to the position of the break. Note that here again the angle of insertion is large and the distance AB is greatly in excess of the theoretical value. The fracture was due to the discontinuity of structure of the stem at a point near the fulcrum.

At operation in November, 1952, it was found that there had been a fracture of the inferior aspect of the femoral neck. It is probable that fracture of the bone, under high bending moment, occurred first, resulting in a shift of the fulcrum laterally. The primary cause of fracture may have been interference with the blood supply at the time of operation. The prosthesis was not available for examination.

The neck was further cut back and reamed and a second prosthesis with an extended head was inserted; Fig. 10 shows that the skirt is impinging on the lower portion of the neck. The distance AB has been further increased. Ten weeks later this prosthesis broke (Fig. 11). The design of the second prosthesis and the unsuitable metal used for reinforcement were contributory factors in its failure. The metal rod, diameter 6.1 mm., was of non-austenitic steel. There was no bonding between the metal rod and the acrylic. The radius at the junction of the skirt with the base of the head was insufficient and there was crazing of the head and stem. There was a visible leak around the acrylic plug.

Case 3

This case illustrates excessive bone absorption and fracture of the stem of the prosthesis through a weak part.

A married woman aged 79, suffering from osteoarthritis, had a right Judet arthroplasty performed in August, 1952. The angle of insertion was approximately 43 degrees (Fig. 12). Progress was satisfactory with no pain until April, 1953, when she complained of severe pain in the hip with some crepitus on movement. A radiograph shows that the stem of the prosthesis had fractured at the cross-section where the metal rod had been drilled, and that there had been considerable widening of the track, the angle of insertion having now increased to 55 degrees (Fig. 13). No fracture of the neck of the femur was visible, but there had been considerable bone absorption of the neck, and the base of the head no longer appeared to be in contact with the bone. The stem was apparently firmly held at its distal end, but with gradual bone absorption the fulcrum was shifted laterally, and this resulted in a high bending moment in the region of the fracture site. This bone absorption was probably caused by interference with the blood supply to the proximal part of the neck. Wear of the head of the prosthesis could not be demonstrated. The surface hardness was 23.2. There was no crazing of the surface of the head or skirt, although crazing was present along the stem. The metal rod was of a non-austenitic steel and was positive to the nitric acid test. Corrosion pits were found in the region of the fracture. No leakage of the stem plug could be demonstrated. The reasons for failure were both anatomical and structural.

Case 4

This case illustrates the detection of a failure by means of a transparent outline model.

The patient, a man aged 71, suffering from bilateral osteoarthritis, had a Judet arthroplasty performed on the left side in July, 1951 (Fig. 14). In November he was free from pain and walking well. Movements were as follows: flexion, 45°; extension, 0°; abduction, 20°; adduction, 20°; external rotation, 20°; internal rotation, 20°.

From January to October, 1952, attacks of pain were relieved by diathermy and other physical treatment, but in November the left hip became much worse. A radiograph revealed widening of the track with downward displacement of the prosthesis (Fig. 15). In December, 1952, movements were: flexion, 70°; extension, −20°; abduction, 20°; adduction, 20°; external rotation, 30°; internal rotation, 0°. There was squeaking of the joint on movement.

His condition deteriorated until March, 1953, when little movement was present (Fig. 16). The hip was re-explored and the skirt of the prosthesis was found to be broken. The larger fragments of the skirt were not found. There was considerable wear of the head and eburnation of the stem just below the base of the head.

On examination the prosthesis was found to have a surface hardness in the worn area of the head of 24.7 and in the unworn area of 23.3. There was considerable crazing of the surface of the unworn part of the head although none was visible on the worn area. There was also crazing of the stem and skirt. The nitric acid test on the metal rod was positive, and it was found to be a chromium-plated copper-nickel-zinc alloy rod.

As the stem of the prosthesis did not penetrate the cortex, it was able to rotate downwards about a point situated near the distal end of the stem, the cancellous bone not offering enough resistance to the reactive force at the fulcrum. A transparent model of the outline of the prosthesis when superimposed on the radiograph taken in November, 1952, suggested that failure of the skirt had already occurred.

Intramedullary new bone formation in the neck of the femur has not been seen in any of the radiographs that have been examined. The normal head of the femur is a structure designed to carry considerable load and to distribute it to the neck and shaft by means of the trabeculae, each one being subjected to a small portion of the stress. Insertion of any prosthesis must destroy the three-dimensional structure and result in the overloading of too few trabeculae. The Judet prosthesis is particularly apt to produce this effect, because of the relatively small surface area of the stem and base of the head. The survival of trabeculae and cortical bone depends on maintenance of their blood supply. As part of the blood supply comes through the great trochanter, it would seem advisable not to remove it at operation.

It has not been possible to correlate failure of the prosthesis with the sex, weight, or post-operative activity of the patient. The time between insertion and removal of the prosthesis has varied between two and twenty months.

Discussion

Various defects in the British manufactured prosthesis could have been avoided if a detailed specification had been available. There is no doubt that the design and method of manufacture of all implants should be very carefully considered, so as to avoid the great number of mechanically unsound features with which the original design of the Judet prosthesis as made in this country is overloaded. It is interesting to note that an improved design has recently been developed by Judet *et al.* (1954) in an endeavour to solve some of the problems. They have, for example, abandoned the skirt of the prosthesis. The head has been set at an angle of 60 degrees to the shaft in order to retain more of the head and neck and so distribute the load to a greater area of bone and reduce the distance AB (Fig. B).

There are a number of problems associated with the properties of synthetic materials and metals, especially when they are combined to form a structure which is subjected to the simultaneous action of stress and tissue fluids at body temperature.

Not the least important point is the individual operative technique. This, however, is beyond the scope of this paper, and those primarily concerned with the use of this prosthesis will be able to draw their own conclusions from the observations we have made.

Summary

The mechanics of the hip-joint have been examined, with special reference to the Judet prosthesis. The materials used in the manufacture of the prosthesis and its ultimate strength have been investigated under laboratory conditions. Thirty prostheses which were removed from patients either because of pain and/or mechanical failure were examined in conjunction with the clinical records of the patients concerned.

The disadvantages of the present design can be summarized as follows: (1) The stem is not strong enough. Flexural strength is diminished by fatigue; the acrylic is weakened by crazing and the metal by stress corrosion. Unless the prosthesis is placed in the most favourable position its load-carrying capacity will be exceeded. (2) The skirt is weak and vulnerable, and interferes with revascularization. (3) The head has not sufficient surface hardness. The distribution of the forces acting upon the prosthesis has been examined. It is clear that both the angle of insertion i and the distance AB (Fig. B) must be as small as possible. (4) The local blood supply should be interfered with as little as possible. The great trochanter should not be divided, for both mechanical and anatomical reasons.

The reasons for the large number of worn prostheses require further investigation. In the light of our present knowledge, the use of any prosthesis must be regarded as an experimental procedure. The need for a standardized method of radiological follow-up of cases has been apparent in this work, as well as for a method of recording the clinical results of treatment.

While there are many reasons for failure over which no one can have control, the development of standards governing the materials to be used in the manufacture of prostheses could by now have been devised.

Since writing this paper a further 20 prostheses that have had to be removed from patients have been examined. The information gained has further substantiated the conclusions drawn from our previous work.

We wish to express our thanks to Professor S. J. Davies, Faculty of Engineering, King's College, University of London, for his enthusiastic support in carrying out this work; Professor D. H. Hey and Mr. L. Singlehurst-Ward, King's College, University of London, for their help on metallurgical and chemical problems; and to Mr. G. D. Winter, technical assistant, Plastics Research Unit, for his unfailing willingness in working long hours while engaged with us on the Judet problem. We are indebted to Messrs. Down Bros. Ltd., Lusterlite Ltd., the London Splint Co. Ltd., and the Medical Supply Association Ltd. for supplying samples of material and Judet prostheses.

The following very kindly responded to our appeal for notes, x-ray films, and prostheses, and thus made the work possible: G. Arden, E. H. Bannister, J. Bastow, J. Briggs, H. J. Burrows, St. J. D. Buxton, P. Cromack, F. W. T. Davies, E. O. Davis, M. B. Devas, E. A. Devenish, G. R. Fisk, A. Fletcher, A. T. Fripp, J. Garden, W. Gissane, L. C. Gonet, C. Gray, W. Herschell, S. L. Higgs, K. F. Hulbert, J. P. Jackson, A. W. L. Kessel, T. King (Australia), W. B. Law, P. S. London, K. Lucas, D. V. Marshall, M. L. Mason, J. S. Maxwell, K. I. Nissen, G. Platt, E. Shephard, N. A. Stephens, D. Trevor, W. Waugh, W. A. Watt-Maney, K. G. Westcombe, V. H. Wheble, B. L. Whitaker, P. Wiles.

REFERENCES

Endler, F. (1953a). *Ver. dtsch. orthop. Ges.*, **83**, 300.
—— (1953b). *Z. Orthop.*, **84**, 1.
Hoff, E. A. W. (1952). *J. appl. Chem.*, **2**, 441.
Judet, J. and R. (1950) *J. Bone Jt Surg.*, **32B**, 166.
—— (1952). Ibid., **34B**, 173.
—— Lagrange, J., and Dunoyer, J. (1954). *Resection-Reconstruction of the Hip-Joint*, translated from the French by Karl Nissen. Livingstone, Edinburgh.
MacConaill, M. A. (1950). *J. Bone Jt Surg.*, **32B**, 244.
Maxwell, B., and Harrington, J. P. (1952). *Trans. Amer. Soc. mech. Engrs*, p. 579.
Osborne, G. V., and Fahrni, W. H. (1950). *J. Bone Jt Surg.*, **32B**, 148.
Ros y Codorniu, A. H. (1949). *Cirug. Apar. locomotor*, **6**, 11.
Russell, E. W. (1948). *Report Chem.*, 447. R.A.E., Farnborough, Hants.
—— (1950). *Nature, Lond.*, **165**, 91.
Sauer, J. A., and Hsiao, C. C. (1953). *Trans. Amer. Soc. mech. Engrs*, p. 895.
Scales, J. T. (1951). *Plastics Progress*, p. 295. Iliffe, London.
Tucker, F. R. (1949). *J. Bone Jt Surg.*, **31B**, 82.

HEPARIN AND ETHYL BISCOUMACETATE IN PREVENTION OF EXPERIMENTAL VENOUS THROMBOSIS

BY

PAMELA JEWELL, M.B., B.S.
Lecturer in Bacteriology

THOMAS PILKINGTON, M.D., M.R.C.P.
Medical First Assistant

AND

BRIAN ROBINSON, M.B., M.R.C.P.
Late Resident Clinical Pathologist
St. George's Hospital Medical School

[WITH SPECIAL PLATE]

In recent years anticoagulant drugs have been increasingly used for the treatment of thrombo-embolic disease. There are two groups of these drugs—those which lengthen the clotting-time (heparin group), and those which lengthen the so-called prothrombin time (coumarin derivatives): of the latter group ethyl biscoumacetate ("tromexan") is a typical example.

Many clinicians believe that heparin is more efficient in preventing thrombosis, and choose ethyl biscoumacetate only because it can be given by mouth. We have, however, found no clinical or experimental evidence for this belief; the only experiment reported in the literature which compares the ability of heparin with that of dicoumarol in preventing thrombosis following damage to the vein wall was one performed in rabbits, and led to the conclusion that neither drug was effective (Moses, 1945). This lack of support for clinical impressions prompted us to study the relative actions of heparin and ethyl biscoumacetate in preventing thrombosis following experimentally induced phlebitis in rabbits. The drugs were given in a manner as closely comparable as possible to the methods of administration used in clinical practice.

Methods

Buck rabbits weighing from 1.8 to 3 kg. were used; they were fed on a mixture of bran and oats, with fresh greens and an unrestricted amount of water.

Administration of anticoagulants was controlled by frequent examinations of venous blood taken from a marginal ear vein reserved for this purpose. In the case of heparin, clotting-times were estimated by Wright's capillary

tube method, which is simpler than the Lee and White method, and was found by us to give equally satisfactory results. Normal clotting-times varied from 5 to 12 minutes. Ethyl biscoumacetate administration was controlled by prothrombin times estimated by Quick's one-stage method, using human brain thromboplastin. Owing to the rapidity with which rabbit's blood will clot, consistent prothrombin times could not be obtained unless the following technique was adopted: all the glassware was treated with silicone and cooled before use, a solution of potassium oxalate was used as anticoagulant in the syringe, and the estimations were made within half an hour of taking the blood. With this method the normal prothrombin time varied between 11 and 16 seconds in rabbits, compared with 15–16 seconds in man.

A total of 95 rabbits was used: of these, 31 were treated with ethyl biscoumacetate and 34 with heparin, while 30 were used as controls. A satisfactory anticoagulant effect was first established and then the vein wall was damaged by chemical irritation. In both control and treated animals 0.1 ml. of monoethanolamine oleate ("ethamolin") was injected into one of the marginal ear veins in the direction of the blood flow and held in a 4-cm. length of vein for five minutes, by digital pressure above and below. The irritant effect of this procedure was confirmed by the fact that microscopical examination showed inflammation in and around the vein wall even when there was no thrombosis. Following the injection of monoethanolamine oleate the anticoagulant drugs were continued for a further five days. The rabbits were then lightly anaesthetized with sodium thiopentone, and phlebograms of the ear veins were made, using 1 ml. of 50% diodone. The animals were immediately killed and the ears were preserved for histological examination.

Experimental

Heparin

Throughout, the heparin was used in a concentration of 5,000 units per ml.; the doses per kilogram were two to three times those used in man. Monoethanolamine was injected 24 hours after treatment had started.

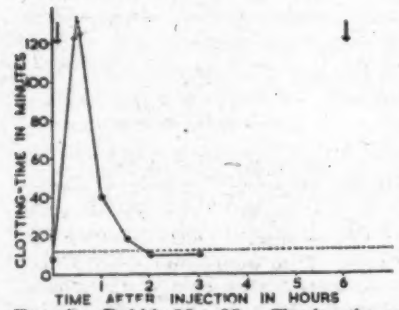


FIG. A.—Rabbit No. 95. Clotting-times following an intravenous injection of 800 units of heparin: six-hourly administration. The dotted line indicates the upper limit of the normal clotting-time, the arrows indicate times of injections.

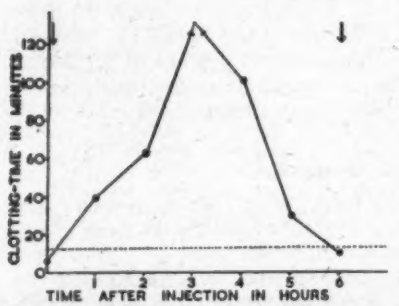


FIG. B.—Rabbit No. 81. Clotting-times following an intramuscular injection of 1,200 units of heparin: six-hourly administration.

Following Jorpes's (1950) recommendation for the most effective use of the drug in man, 11 rabbits were given intravenous injections of heparin every six hours: the doses were 500–1,000 units, according to weight. Clotting-times rose immediately after injection to over 120 minutes, but by two to two and a half hours they had returned to normal (Fig. A).

In 10 rabbits 1,000 to 1,500 units of heparin was given intramuscularly every six hours. The clotting-time was most prolonged at two and a half hours, and in the majority of animals did not return to normal until just before the next injection was due (Fig. B).

An attempt was then made in 13 rabbits to prevent the clotting-times from ever falling to normal. Intramuscular injections of 500 to 1,000 units were given every four hours. In most instances prolonged clotting times were well maintained (Fig. C), but of the 50 estimations made before injections were due 12 showed a fall to normal.

The only form of bleeding which occurred in any rabbit receiving heparin was into the site of the injection, which in the last group was occasionally sufficient to produce a temporary but obvious anaemia.

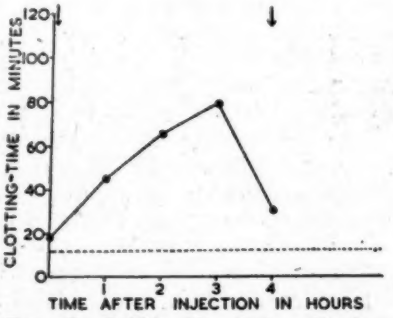


FIG. C.—Rabbit No. 103. Clotting-times following an intramuscular injection of 800 units of heparin: four-hourly administration.

Ethyl Biscoumacetate

The drug was given in capsules twice a day: the initial loading dose was estimated according to body weight, and the maintenance dose was controlled by daily estimations of prothrombin time. This dose varied from 20 to 80 mg. a day, and was two to three times the dose used in man. In most cases the prothrombin time reached a steady level in three to four days and the injection of the sclerosing agent was then given.

Rigid control of the effect of ethyl biscoumacetate was difficult, resulting in a wide range of prothrombin times, and according to these it was found that the animals could conveniently be divided into three groups. The prothrombin times for one rabbit in each group are shown in Fig. D.

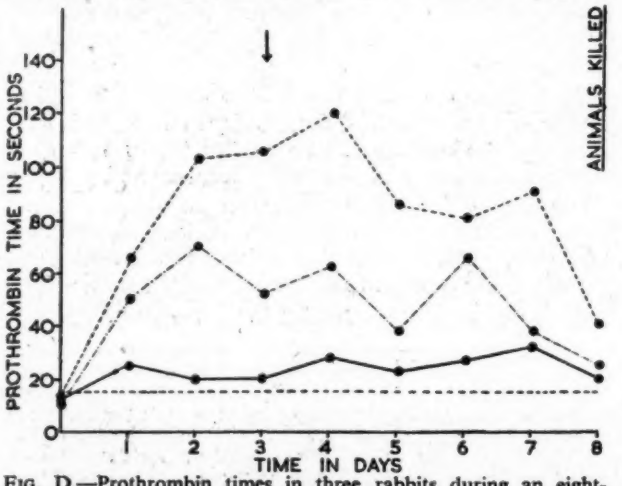


FIG. D.—Prothrombin times in three rabbits during an eight-day period on ethyl biscoumacetate. The arrow indicates injection of sclerosing agent.

Seven animals had prothrombin times which rose above 75 seconds, in 12 they rose to between 35 and 75 seconds, and in 12 to between 19 and 35 seconds. The last two groups had times comparable to those maintained with safety in man. With ethyl biscoumacetate there was no example of spontaneous external or internal bleeding, although in the presence of the more prolonged prothrombin times it was sometimes difficult to arrest the bleeding at the site of venepuncture.

Results

The phlebograms showed one of three findings: (*a*) complete patency, (*b*) a filling defect representing a partial

block, or (*c*) complete occlusion (Figs. E, F, and G). Similarly the microscopical examination of the vein made on 5–8 transverse sections of the traumatized area showed (*a*) absence of thrombus, (*b*) small mural thrombus, (*c*) large mural thrombus, and (*d*) blockage by thrombus (Plate, Figs. 1 and 2).

Control Group.—In 28 of the 30 control animals extensive thrombosis occurred, and there was radiological evidence of this in 26 of the 27 veins examined.

Heparin-treated Group.—The effects of heparin are summarized in Table I. As many as 25 of 34 veins of heparin-treated animals showed extensive thrombosis, six showed mural thrombosis, and only three veins were quite normal: in fact, there was no significant difference between these results and those of the control group. When the results with the three different modes of heparin administration were examined it was found that they were all equally unsuccessful (Table II). Even when the prolonged clotting-times were almost continuously maintained the results were not significantly better.

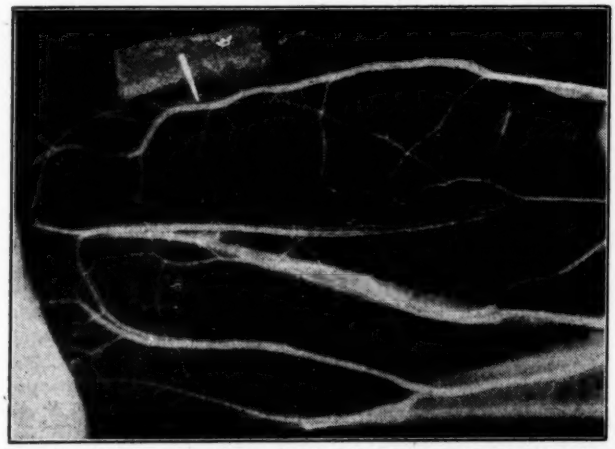


FIG. E.—Phlebogram of an ear showing apparently normal veins in a rabbit which received ethyl biscoumacetate. The marker indicates the point of injection of the sclerosing agent.

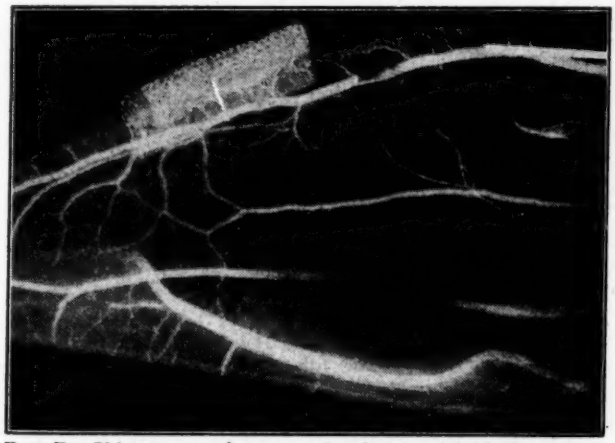


FIG. F.—Phlebogram of an ear showing partial blockage in a rabbit which had received heparin.

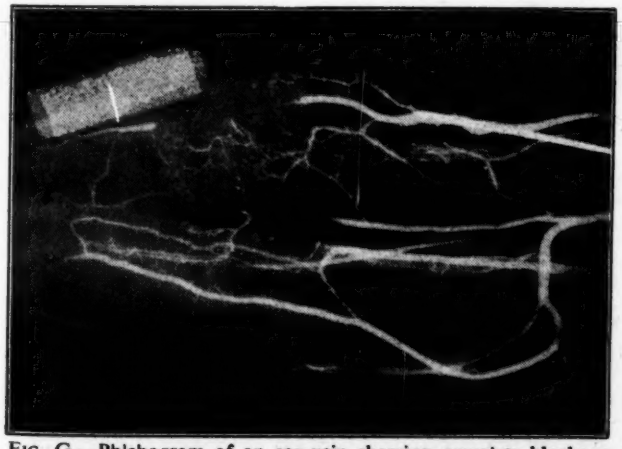


FIG. G.—Phlebogram of an ear vein showing complete blockage in a rabbit which had received heparin.

TABLE I.—*Effects of Heparin on the Occurrence of Venous Thrombosis*

A. Phlebography

	Total	Patent	Partial Block	Complete Block
Heparin ..	32	5	8	19
Control ..	27	1	3	23

0·2>P>0·1

B. Histology

	Total	Normal	Small Mural Thrombus	Large Mural Thrombus	Complete Occlusion
Heparin ..	34	3	6	10	15
Control ..	30	1	1	8	20

0·2>P>0·1

TABLE II.—*Effect of Different Methods of Administration of Heparin on the Occurrence of Venous Thrombosis*

A. Phlebography

Method	Total	Patent	Partial Block	Complete Block
Intravenous ..	10	1	1	8
Intramuscular 6-hourly ..	9	1	4	4
Intramuscular 4-hourly ..	12	3	3	6

B. Histology

Method	Total	Normal	Small Mural Thrombus	Large Mural Thrombus	Complete Block
Intravenous ..	11	0	2	3	6
Intramuscular 6-hourly ..	10	1	2	4	3
Intramuscular 4-hourly ..	13	2	2	4	5

Group Treated with Ethyl Biscoumacetate.—The results with this drug are summarized in Table III. Of the 31 animals which had received ethyl biscoumacetate, only four showed extensive thrombosis. It is interesting to note, although not statistically significant, that the four animals in which ethyl biscoumacetate failed came into the group with the least-prolonged prothrombin times. Even in this group, however, there was significantly less thrombosis than in the control animals ($P<0.01$).

TABLE III.—*Effects of Ethyl Biscoumacetate on the Occurrence of Thrombosis*

A. Phlebography

	Total	Patent	Partial Block	Complete Block
Ethyl biscoumacetate ..	26	24	0	2
Control ..	27	1	3	23

P<0·01

B. Histology

	Total	Normal	Small Mural Thrombus	Large Mural Thrombus	Complete Occlusion
Ethyl biscoumacetate ..	31	22	5	3	1
Control ..	30	1	1	8	20

P<0·01

Discussion

Our experiments indicate that heparin fails to prevent the occurrence of thrombosis in veins damaged by chemical irritation. Even when achieving almost continuous prolongation of clotting-time, with heparin given intramuscularly every four hours, no significant inhibition of thrombosis was obtained. This failure might be explained in part by the fact that we used discontinuous administration, either intravenously or intramuscularly, as suggested by Swedish workers (Crafoord, 1939; Jorpes, 1950), and in no rabbit could we be sure that the clotting-time was always above normal. Our results would seem to support those obtained in the original experiments with heparin, in which good effects were achieved only when the drug was given by continuous transfusion (Murray *et al.*, 1937).

On the other hand, ethyl biscoumacetate was found to be highly successful in preventing thrombosis. Similarly successful results were obtained with ethyl biscoumacetate using the arteries of dogs (Reinis, 1950), and also with dicoumarol (Dale and Jaques, 1942; Richards and Cortell, 1942; Thill *et al.*, 1943). The doses of ethyl biscoumacetate used by us were only slightly (two to three times) greater than those used in man, and they produced a comparable prolongation of prothrombin time, which differs from the findings of Wright *et al.* (1953), who found it necessary to give much larger doses of ethyl biscoumacetate (more than 20 times the human dose) to achieve comparable effects.

While experimental results in rabbits cannot be applied directly to man, we feel that the unexpected differences found between the two drugs makes it desirable that their comparative value in the prevention of thrombosis in man should be critically assessed.

Summary

A comparison was made between the actions of heparin and ethyl biscoumacetate in preventing thrombosis in chemically induced thrombophlebitis in rabbits. Ethyl biscoumacetate was strikingly successful when given in doses comparable to those used in man, whereas under the same conditions heparin did not significantly reduce the incidence of thrombosis.

We are extremely grateful to Professor T. Crawford for his guidance and for performing all the histological examinations, to Dr. S. D. Elek and Dr. J. N. M. Chalmers for their help and encouragement, and to Dr. Fraser Roberts for the statistical analysis. We are indebted to Evans Medical Supplies Ltd. for the supplies of heparin, and to Geigy Ltd. for supplies of tromexan. We wish to thank the Board of Governors of St. George's Hospital for a grant from their Endowment Fund towards the expenses of the investigation.

REFERENCES

Crafoord, C. (1939). *Acta chir. scand.*, **82**, 319.
Dale, D. U., and Jaques, L. B. (1942). *Canad. med. Ass. J.*, **46**, 546.
Jorpes, J. E. (1950). *Acta chir. scand.*, Suppl. 149.
Moses, C. (1945). *Proc. Soc. exp. Biol., N.Y.*, **59**, 25.
Murray, D. W. G., Jaques, L. B., Perrett, T. S., and Best, C. H. (1937). *Surgery*, **2**, 163.
Reinis, Z. (1950). *Presse méd.*, **58**, 475.
Richards, R. K., and Cortell, R. (1942). *Proc. Soc. exp. Biol., N.Y.*, **50**, 237.
Thill, C. J., Stafford, W. T., Spooner, M., and Meyer, O. O. (1943). Ibid., **54**, 333.
Wright, H. P., Kubik, M. M., and Hayden, M. (1953). *British Medical Journal*, **1**, 1021.

An Ehrlich–von Behring Centenary postage stamp was issued in March by the West German Government. It is a 10-pfennig stamp with the heads of Ehrlich and von Behring facing right on a mid-green background, the names of the two scientists and the dates "14 und 15 Maerz 1854." The stamp has now been included in the Ehrlich exhibition arranged by the Wellcome Historical Medical Museum at 183, Euston Road, London, N.W.1.

THE NUMBER OF MELANOCYTES IN HUMAN EPIDERMIS

BY

G. SZABÓ, M.Sc.

Department of Zoology, University College, University of London

[WITH SPECIAL PLATE]

Melanomas of skin (cf. Raven, 1950; Pack *et al.*, 1953; Clark and MacDonald, 1953; Wright *et al.*, 1953) have a characteristic regional frequency distribution. Melanomas are more frequent per unit area on the face, neck, feet, and external genitalia than on other regions of the body. It is now almost universally believed that, in cellular origin, melanomas of skin arise from pigmentary dendritic cells, "myelanocytes."

There are alternative (but not mutually) exclusive reasons why the frequency of melanomas should vary from one part of the body to another: (*a*) the individual melanocytes have different degrees of susceptibility to malignant change, or are more exposed in certain areas to stimuli predisposing them towards this transformation; or (*b*) the likelihood of a melanocyte's undergoing malignant transformation is fairly constant throughout the body, and the observed differences of frequency are mainly due to differences of population density. Wright *et al.* (1953) have already suggested that there may be a greater concentration of "melanoblasts or precursors" in the skin of lower limbs, head, and neck than of upper limbs. Their opinion was based on observations of the duration of sun-tanning and not on statistical cellular counts.

The present investigation therefore represents a first attempt to estimate the frequency distribution of melanocytes in different regions of the human body. It was founded upon the use of Bloch's "dopa reaction" in conjunction with the "skin-splitting" technique of Billingham and Medawar (1951), which causes the epidermis to separate cleanly from the corium by enzymatic fission. By using these methods, counts of melanocytes were carried out by the methods described in full by Billingham and Medawar (1953). These authors have already shown that there are about twice as many melanocytes per mm.^{2} in guinea-pig's ear skin than in trunk skin, but both showed great variation between individuals. There was no correlation between melanocyte concentration and differences of colour.

This report contains only a first series of estimations, relating chiefly to the melanocytes of the skin of the thigh and arms.

Material and Methods

Human skin was obtained in the course of plastic surgical operations through the kindness of Mr. Rainsford Mowlem, at the Middlesex Hospital. The skin samples, removed as Thiersch (thin "split thickness") grafts, were incubated in buffered commercial trypsin solution to bring about the disengagement of the epidermis. The epidermis was thereupon stuck to a cover-glass, inner (dermal) side uppermost, with paraffin and rubber stopcock lubricant, fixed in 1–2% formol-saline overnight or sometimes longer (two to four days), and then incubated at 38° C., until the melanocytes turned dark, in a 1:1,000 solution of 3:4-dihydroxyphenylalanine adjusted by phosphate buffer to *p*H 7.4. After a second fixation in 4% formol-saline, followed by dehydration and cleaning, the pure epidermal sheets were permanently mounted in Canada balsam for inspection from the inner

side (Plate, Figs. 1–4). On a number of occasions very thin Thiersch grafts were impregnated with the dopa reagent without splitting : in these specimens the dermis was thin enough to be transparent. Paracarmine was sometimes used as a counterstain, to make the epidermal pattern more easily visible.

These methods are unsuitable for counting melanocytes in hair follicles.

Observations

The numerical results are set out in the accompanying Table, with information on the sex and age of the subject, the position and extent of the area counted (usually in 10

Population Densities of Melanocytes in Various Regions of the Body

Specimen No.	Sex	Age	Area Counted mm.²	Population Density mm.²	Notes
			Thigh		
11	M	21	0·3424	790±40	
12	F	44	0·3424	900±50	Fig. 2
30	F	19	0·3424	1,230±30	
33	F	56	0·3424	1,400±64	
36	M	37	0·3424	1,850±90	No epidermal pattern
44	F	73	0·3424	580±44	
53	M	75	0·3424	670±40	
63	F	44	0·3424	500±30	
65	M	60	0·3424	900±50	
68	F	53	0·3424	560±40	
			Overall mean: 940±140 melanocytes/mm.²		
			Upper Arm		
15	F	44	0·1150	1,540±130	
27	F	61	0·1712	950±10	
28	M	51	0·3424	820±20	
38	M	45	0·3424	1,490±130	
			Overall mean: 1,200±180		
			Forearm		
24	M	17	0·3424	820±50	
45	M	15	0·1150	1,070±70	
62	M	42	0·0804	1,210±60	
			Head and Neck		
13	M	44	0·1150	4,500±100	Cheek
29	M	25	0·3424	2,050±70	Cheek, normal and scar, Fig. 3
45	M	15	0·1150	3,500±170	Cheek, Fig. 4
34	F	39	0·1712	2,300±100	Forehead
53	M	75	0·3424	1,100±100	,,
16	M	9	0·3424	1,280±150	Behind ear, Fig. 1
55	F	44	0·1140	2,600±200	Neck, freckled
			Different Areas of Same Individual		
45	M	15	0·1150	1,070±70 3,500±170	Forearm Cheek, Fig. 4
53	M	75	0·3424	670±40 1,100±100 940±60	Thigh Forehead Over nasal bridge
55	F	44	0·1150	2,600±200	Neck, freckled
56	,,	,,	0·3424	1,920±90	Axilla
123	M	73	0·1150	1,640±80	Dorsum of hand
124	,,	,,	0·1150	800±60	Palm

randomly chosen samples), and the mean number of melanocytes per mm.² of the epidermis in plane projection ± the standard error of the mean. The following preliminary conclusions can be drawn from the numerical and histological analyses.

(1) There are great differences between the numbers of melanocytes in corresponding areas of different human beings.

(2) There are also well-defined differences between the numbers of melanocytes in different areas of the same individual. The higher population densities were found on the ear (Fig. 1), cheek (Figs. 3 and 4), forehead and neck areas ; the lower densities on the upper arm, forearm, and thigh (Fig. 2).

(3) Within any one sample of skin, melanocytes are principally concentrated in the epidermal ridges or "hills"—that is, in those areas which appear in orthodox transverse sections as inwardly directed projections of the epidermis into the corium. Between the ridges—that is, in the areas underlain by the dermal papillae—their concentration is lower.

(4) Melanocytes vary greatly in shape. They may be fully dendritic cells, with branches projecting in many directions, or they may be almost fibroblast-like, with only two terminal processes. Although the shapes of melanocytes may be largely influenced by mechanical factors, such as the pattern and mode of packing of neighbouring Malpighian cells, there appears also to be a clear-cut dimorphism, particularly in the skin of the cheek and forehead (Fig. 4) : large melanocytes with abundant cytoplasm lie among the more numerous smaller melanocytes with relatively little cytoplasm.

Comment

The results of this numerical investigation are in favour of the second of the alternative explanations proposed above to account for differences in the frequencies of melanomas between the face and neck on the one hand, and the trunk and thigh on the other—that is, the differences of frequency may be due to differences in the population densities of melanocytes. As no melanocyte counts are yet available from the foot, it is impossible to say whether a similar interpretation may not account for the high frequency of melanomas in this region ; it is relevant, however, that melanocytes are very much more abundant in the sole of the guinea-pig's foot than in the skin of the ears and trunk (Billingham and Medawar, 1948, 1950).

The population densities of melanocytes in different regions of the body are, of course, correlated with differences in the thickness and mitotic activity of the epidermis as a whole. Both may be at least partly under the influence of environmental factors—for example, differences in the degree of exposure to mechanical irritation and radiation—but cell counts on infants would be necessary to determine what proportion of the difference was due merely to environmental factors. It is already known that some differences of epidermal thickness—for example, between trunk and sole-of-foot skin—are of developmental origin.

A dimorphism of melanocytes was also found by Grand *et al.* (1935) among the melanocytes of melanomas of mice and of human origin, cultured *in vitro*.

Summary

In human epidermis the population density of melanocytes (pigmentary dendritic cells) is of the order of 1,000 per mm.² in the skin of the thigh and arms, but may be twice to four times as great in the skin of the face and forehead. There is nevertheless a wide range of variation between the corresponding areas on different individuals. It is suggested that regional differences in the frequency of occurrence of melanomas may be primarily due to differences in the population density of melanocytes.

I am grateful to Mr. Rainsford Mowlem, whose co-operation, interest, and help have made the collection of specimens possible; to Professor P. B. Medawar for suggesting this line of investigation and for correcting the manuscript; and to Mr. R. E. Billingham for his many helpful suggestions. Thanks are also due to Mr. W. Brackenbury for taking the photomicrographs.

REFERENCES

Billingham, R. E., and Medawar, P. B. (1948). *Heredity*, **2**, 29.
—— —— (1950). Ibid., **4**, 141.
—— —— (1951). *J. exp. Biol.*, **28**, 385.
—— —— (1953). *Phil. Trans. B*, **237**, 151.
Clark, R. L., and MacDonald, E. J. (1953). In *Pigment Cell Growth*, p. 139. New York.
Grand, C. G., Chambers, R., and Cameron, G. (1935). *Amer. J. Cancer*, **24**, 36.
Raven, R. W. (1950). *Ann. roy. Coll. Surg. Engl.*, **6**, 28.
Pack, G. T., Gerber, D. M., and Scharnagel, I. M. (1953). In *Pigment Cell Growth*, p. 177. New York.
Wright, R. B., Clark, D. M., and Milne, J. A. (1953). *Brit. J. Surg.*, **40**, 360.

CONGENITAL SYPHILIS DIAGNOSED BY BONE CHANGES

BY

K. L. MARKS, M.Ch.Orth., F.R.C.S.Ed.

Assistant Orthopaedic Surgeon, Chester Royal Infirmary

[WITH SPECIAL PLATE]

With the improvement in medical care of the syphilitic woman at the time of marriage and during pregnancy, congenital syphilis is becoming a comparative rarity. Many working outside special centres have never had the opportunity of examining an infant who is suffering from the disease. The following is a case history of a patient presenting in the classical manner.

Case Report

A full-term male child born on December 13, 1952, was brought to the casualty department on February 25, 1953, with the history that after an outing in his perambulator the preceding afternoon he had refused to move the left upper limb. When his mother attempted to move the arm the child screamed with pain. He was referred to the fracture clinic as a possible case of pulled elbow or as a doubtful case of greenstick fracture of the left upper humerus.

Clinical examination showed a normal healthy-looking baby of 10 weeks. Movements of all the limbs except the left upper limb were normal. That limb was held by the side, and any attempt at movement was resented. There was tenderness on palpation over the metaphysis at both the proximal and the distal end of the left humerus. A doubtful greenstick fracture of the upper humeral shaft without displacement was demonstrated radiologically. The arm was placed in a collar-and-cuff sling and an appointment was made for the child to be seen in a week's time.

The next day the mother returned to the clinic stating that not only did the child resent movement of the arm but he now refused to move the left lower limb.

Further clinical examination confirmed the loss of function of both the left upper and lower limbs. There were no visible physical signs other than the "paralysis," but the metaphysial regions of all four limbs were found to be tender on palpation. Radiographic examination demonstrated well-marked osteochondritis and chondro-epiphysitis in the long bones of all four limbs. Figs. 1 and 2 (Special Plate) show the right upper limb and the left lower limb. The temporary zone of calcification in the distal metaphysis in the radius and ulna, and particularly the femur, is thickened and shows as a white line. The submetaphysial zone is decalcified and is shown best in the radius and ulna. The width of this zone indicates roughly the length of intrauterine infection. The irregularity of the decalcification is best shown at the proximal end of the tibia (Fig. 3). Further radiographs one month later demonstrated increasing irregularity of decalcification and commencing periostitis. The Wassermann reaction was ++; Kahn reaction +; and quantitative Kahn 240 units.

Only after positive serological findings did the mother concede the positive family history. Both parents had received treatment at a special centre from October 2, 1946, until September 13, 1947, when both defaulted. There was an older child born on May 27, 1948, who was serologically and clinically normal.

Discussion

Jones and Lovett (1933) state that osteochondritis is the most common manifestation of congenital syphilis in infants. As in this patient, it is symmetrical and may give rise to the classical pseudo-paralysis. Gumpesberger (1951), in an investigation of *x*-ray changes in 571 infants and young children of treated and untreated syphilitic mothers, noted that of 57 serologically positive cases with congenital syphilis 34 showed syphilitic bone changes.

In the above case the diagnosis was made from the positive radiographs. These in turn led to confirmatory serological tests. Had the child not presented with pseudo-paralysis in both the left upper and lower limbs the diagnosis might well have been missed.

REFERENCES

Gumpesberger, G. (1951). *Dermatologica, Basel*, **103**, 19.
Jones, Sir Robert, and Lovett, R. W. (1933). *Orthopaedic Surgery*, 2nd ed., p. 295. London.

TABETIC CHARCOT'S SPINE

REPORT OF EIGHT CASES

BY

DOUGLAS J. CAMPBELL, F.R.C.P.Ed.

AND

J. OLIVER DOYLE, M.D., M.R.C.P.I.

From the Department of Venereology, Royal Hospital, Sheffield

In 1868 Charcot first described tabetic arthropathy of the spine. The condition is believed to be the rarest arthropathy occurring in tabes dorsalis and is a relatively uncommon disorder. Charcot's spine is diagnosed largely on circumstantial evidence (stigmata, history, Wassermann reaction) rather than on local recognition. It may be discovered quite accidentally during the course of a barium-meal examination.

The following eight cases seen during the past two years in the Department of Venereology, Sheffield Area, are thought to be interesting enough to merit publication.

Case Reports

Case 1.—A labourer aged 50 was admitted on November 14, 1950, to the medical ward, City General Hospital, with severe abdominal pain, and a twelve-months history of delay in micturition. He had clinical signs of tabes—Argyll Robertson pupils, absent knee- and ankle-jerks, positive Romberg's sign—and "lightning" pains in the limbs and chest. Barium meal and fasting test meal were normal. He had been treated for syphilis 15 years previously, but defaulted. The blood Wassermann reaction and Kahn tests were negative. On November 24 he complained of pain in the lumbar area. *X*-ray report on lumbar spine: "Lesion involves second and third lumbar vertebrae chiefly; there is considerable destruction of bone, with the separation of the fragments and new bone formation. Mainly a destructive lesion with little if any sclerosis. There is fairly marked scoliosis." Examination of the cerebrospinal fluid showed: clear fluid; Wassermann reaction positive 1:2; white cells, 10 per c.mm.; protein, 120 mg. per 100 ml.; globulin, very slight increase; Lange, 0000000000. Despite treatment with penicillin, arsenic, and bismuth, in August, 1952, the patient complained of tenderness of the right foot, and the radiologist reported the appearances as those of well-developed Charcot's disease.

Case 2.—A millwright aged 53 attended the special treatment centre, Sheffield Royal Infirmary, on March 1, 1948, complaining of "shooting" pains in his legs of three years' duration. He had clinical signs of tabes dorsalis—Argyll Robertson pupils, knee- and ankle-jerks absent. The blood Wassermann reaction was positive 1:160, Kahn ++++. Penicillin, tryparsamide, and bismuth gave little relief of symptoms. On February 21, 1952, he complained of pain in the lumbar region. Examination revealed marked scoliosis. Lumbar puncture was attempted, but was not

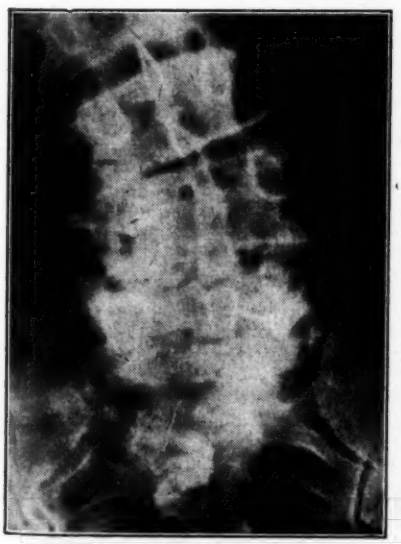
successful. *X*-ray report on spine: "In the lumbar spine there is gross destruction and deformation of the second and third lumbar vertebrae with some bone sclerosis. In the absence of injury this could well be accepted as an example of Charcot's spine." Clinically there was no limitation of spinal movements.

Case 3.—A retired man aged 68 attended Sheffield Royal Infirmary on March 10, 1952, complaining of severe shooting pain in his legs on and off for the past 20 years. He had been treated for syphilis in 1929. Examination revealed typical signs of tabes—bilateral ptosis, Argyll Robertson pupils, knee- and ankle-jerks absent, Romberg's sign strongly positive. Blood Wassermann reaction was negative, Kahn reaction negative. Cerebrospinal fluid: clear; Wassermann reaction, negative; cells, 0 per c.mm.; protein, 40 mg. per 100 ml.; globulin, no increase; Lange, 0000110000.

Procaine penicillin G in oil, followed by arsenic and bismuth, were given, but he continued to get severe shooting pains in the legs. On April 13, 1953, the *x*-ray report on the spine read: "There is a slight forward displacement of the fourth lumbar vertebra on the fifth, and the appearances are consistent with a moderate degree of neuropathic spine."

Case 4.—A housewife aged 55 had had asthma since early childhood. Routine Wassermann reaction and Kahn test were positive in March, 1952. She was referred to the special treatment centre on March 27, where she complained of "shooting" pains in her legs and back of nine months' duration. There were clinical signs of tabes dorsalis—Argyll Robertson pupils, knee- and ankle-jerks sluggish, Romberg's sign positive. Cerebrospinal fluid: clear; pressure normal; white cells, 46 per c.mm.; protein, 50 mg. per 100 ml.; Lange, 3221000000; Wassermann reaction not reported on. She continued to get low back pain, also pain in the rectum, especially at night, and over buttocks. *X*-ray report on spine: "There is an increase in lumbar lordosis with scoliosis, subluxation of the fourth lumbar vertebra and loss of disk space between it and the third. There is new bone formation in the tissue to the left of the third and fourth vertebrae and sclerosis of the bodies of the third, fourth, and fifth lumbar vertebrae. The appearances are those of a neuropathic spine."

Case 5.—A labourer aged 40 attended the special treatment centre of Doncaster Royal Infirmary on May 4, 1952, complaining of swelling of the left testicle for two days. He denied extramarital intercourse. He had been treated for syphilis at another hospital from July, 1944, to June, 1946, when his blood Wassermann reaction was found positive after his first wife's infidelity, and then defaulted from surveillance. Examination showed a gumma of the left testicle and typical signs of tabes dorsalis — pupils dilated and fixed, knee- and ankle-jerks absent, Romberg's sign positive. Blood Wassermann reaction and Kahn test were doubtful. His mother had been treated for venereal disease and his four brothers and three sisters had died in early childhood. One brother had no nose and one sister had only one arm. The patient had a well-marked kyphoscoliosis and swelling of the right knee-joint. *X*-ray report on spine on May 7: "A well-marked scoliokyphosis of the dorsal spine with reverse curve in the lumbar region. In the latter region the lower three lumbar vertebrae show a marked deformity due to bone destruction and proliferation. The intervening disks are disorganized and there is a marked hyperostosis of the articular processes. The appearances are consistent with neuropathic bone disease" (see illustration). An *x*-ray film of the right knee showed a neuropathic joint. In August, 1945, whilst attending another hospital, an *x*-ray examination showed extensive scoliosis and osteoarthritis of the spine. The patient had no symptoms referable to the spine or right knee-joint. In view of the family history he would appear to be suffering from hereditary Charcot's spine. He later developed a perforating ulcer on the ball of the right foot.



Case 5. Radiograph of spine.

Case 6.—A labourer aged 59 attended the orthopaedic department of Doncaster Royal Infirmary on October 4, 1952, with a spontaneous fracture of the left femur. A Smith-Petersen pin was inserted, and during serial *x*-ray control arthritic changes were noticed in the lumbar spine. The changes are consistent with Charcot's spine, although not absolutely typical. The blood Wassermann reaction was positive 1:80; Kahn +++. He had clinical evidence of tabes dorsalis and slight scoliosis with the convexity to the left, but there were no symptoms referable to the spine. Cerebrospinal fluid examination showed: clear fluid; pressure normal; cells, no increase; globulin, negative; Lange colloidal gold curve, 0011100000; Wassermann reaction not reported on. In 1918 he had had 12 injections of arsenic for syphilis.

Case 7.—A miner aged 57 had classical signs of tabes dorsalis—pupils fixed, knee- and ankle-jerks absent, Romberg's sign positive. The blood Wassermann reaction was positive 1:20; Kahn +++. Had been treated at the special treatment centre of Doncaster Royal Infirmary from November 4, 1949, to July 14, 1950, with penicillin, arsenic, and bismuth; then defaulted. In May, 1953, he developed a swelling of the ankles and reattended. Examination showed pitting oedema of the ankles; nothing gross in the cardiovascular system; urine normal; scoliosis with the convexity to the left; tenderness on pressure over the third lumbar vertebra. *X*-ray report on spine: "The lumbar spine shows a marked scoliosis convexity to the left with flattening of the disk and lipping on the concavity of the spinal curve. There is a good deal of sclerosis of the vertebral bodies and the upper cartilage plate of the fifth lumbar vertebra is collapsed. The appearances are consistent with neuropathic disease." The patient had had an injury to the spine in a coal-mine on October 20, 1947. An *X*-ray film taken next day was reported on as follows: "Lumbar scoliosis, congenital abnormality of sacrum or last lumbar vertebra. Marked osteoarthritis of spine. No recent bony injury. Developmental abnormality at lumbosacral junction."

Case 8.—A miner aged 55 was referred to the special treatment centre of Doncaster Royal Infirmary in April, 1951, as a case of tabes dorsalis. There were classical signs of tabes, including Argyll Robertson pupils, knee- and ankle-jerks absent, Romberg's sign positive. He complained of severe "shooting" pains in his legs and trunk. The blood Wassermann reaction was positive; Kahn ++. Cerebrospinal fluid: clear; pressure normal; cells, no increase; protein, 15 mg. per 100 ml.; Lange, 1122100000. Penicillin, arsenic, and bismuth produced no improvement in shooting pains. Later he complained of severe pain in the right hypochondrium somewhat suggestive of gastric ulcer pain. Barium-meal examination revealed no ulcer in either the stomach or the duodenum. However, during screening marked arthritic changes were noticed in the lower lumbar spine, somewhat suggestive of neuropathic disease. Further *x*-ray films of the spine revealed very extensive changes in the lower lumbar spine with bone destruction and new bone formation, the appearances being those of Charcot's spine. Clinically there was no deformity of the spine or any limitation of spinal movement.

Discussion

According to Herndon (1927), one of the most characteristic features of Charcot's spine is the disproportion between the severity of the process disclosed by the *x*-ray film and the slight discomfort and disability complained of by the patient. Usually, clinical evidence of tabes is present. One of the earliest and most constant signs is deformity which is due to bone destruction and subsequent compression of the vertebral body with posterior or lateral displacement. This process is usually limited to one or two vertebrae, and is most often found in the lower dorsal and lumbar spine. The resulting deformity is usually a kyphus with more or less lateral curvature and rotation. There is usually no tenderness and no muscle spasm.

Considerable discomfort is often caused by pressure of the collapsing spine or that of hypertrophic bone formation upon the spinal nerves. These root pains are usually gradual and insidious in onset and of moderate severity. Occasionally, however, they attain considerable intensity, somewhat simulating gastric crises or peptic ulcer pain. The mobility of the spine is little involved unless in cases of excessive destruction.

The existence of hereditary Charcot's spine has long been doubted, but it is now an acknowledged fact. Various observers consider many cases of apparent Pott's disease associated with other joint involvement in young children as luetic.

It is claimed that radiologically the alternation between sclerosis and rarefaction, bone absorption and bone apposition, is the most striking feature in Charcot's spine. In some cases the destructive, in others the proliferative, changes prevail. Often both are seen concomitantly.

The treatment of Charcot's spine consists in general antiluetic therapy and local measures for support and immobilization of the spine.

Summary

Tabetic Charcot's spine probably occurs much more commonly than most textbooks lead us to believe. Severe persistent shooting pains, especially of a girdle distribution, should indicate an *x*-ray examination of the spine in order to rule out Charcot's disease. Brief case histories of eight tabetics with Charcot's spine are presented.

In Case 7 trauma would appear to have been a predisposing factor in the aetiology of the Charcot's spine.

We are indebted to Drs. M. M. Beveridge and A. I. Morrison, of the Department of Venereology, for assistance in the preparation of this paper.

BIBLIOGRAPHY

Goodman, R. D. (1949). *Amer. J. Roentgenol.*, **62**, 531.
Herndon, R. F. (1927). *J. Bone Jt Surg.*, **9**, 605.
Key, J. A. (1945). *Urol. cutan. Rev.*, **49**, 161.
Steindler, A. (1929). *Diseases and Deformities of the Spine and Thorax*, p. 493. St. Louis.

Because reports were being received that some nurses and doctors working both in hospital and in public health services were suffering from dermatitis after giving injections of streptomycin and penicillin, an inquiry was instituted into the best way of preventing it. As a result, recommendations for an improved injection technique for giving antibiotics were approved by the Standing Medical Advisory Committee of the Central Health Services Council and announced to hospitals and local health authorities (see *British Medical Journal*, 1953, **2**, 40). The Ministry of Health has now made a ten-minute 16-mm. film to illustrate the technique. The film is for use in teaching student and postgraduate nurses, and is also suitable for showing to doctors, pharmacists, and medical students. Copies of the film may be hired (5s. for the first day, 1s. for subsequent days) from the Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3. The film was written and directed by Margaret Thomson and made by Basic Films.

VITAMIN K_1 IN ANTICOAGULANT THERAPY

BY

M. TOOHEY, M.D., M.R.C.P.
Physician, New End Hospital, London, N.W.3

Vitamin K_1 has proved to be a most potent antidote to anticoagulant drugs with a prothrombopenic action, and is clearly the antidote of choice in controlling the dangers of anticoagulant therapy. The use of large doses of vitamin K_1 in patients on anticoagulant therapy, with the consequential restoration of the blood prothrombin to normal or near normal levels, only, however, replaces the danger, or possible danger, of haemorrhage by that of a possible further thrombotic or embolic episode. In addition, large doses of vitamin K_1 are very likely to make the patient refractory to further anticoagulant therapy. Valuable time may therefore be lost in assessing the correct dose of the anticoagulant drug required to restore and maintain an adequate reduction in the blood prothrombin level. Therefore, whenever it is intended to continue anticoagulant therapy it is essential to use vitamin K_1 with the utmost discretion and to prescribe, so far as is possible, the *minimum* effective dose.

Assessment of Minimum Effective Dosage

To assess the minimum effective dose of vitamin K_1 required to antagonize the action of anticoagulant drugs is not easy. In addition to the actual level of the blood prothrombin (which is, of course, in itself very important) and the presence or otherwise of haemorrhage, several other factors must be considered, including the type of anticoagulant used and the general condition of the patient. Long-acting cumulative anticoagulants such as dicoumarol, phenylpropyl-hydroxycoumarin (" marcoumar "), and cyclocumarol (" cumopyran ") require larger doses of vitamin K_1 than the short-acting anticoagulants, such as phenylindanedione (" dindevan ") or ethyl biscoumacetate (" tromexan ").

The stage of anticoagulant therapy reached must also be taken into account; sometimes in the first few days of anticoagulant therapy, owing to the unavoidable difficulty of assessing the correct dose of the anticoagulant, the blood prothrombin may be reduced to too low a level. In most cases merely withholding further doses of the anticoagulant will then be sufficient to restore the prothrombin content to within a therapeutic and safe range. Where, however, the blood prothrombin is so severely reduced that haemorrhage is likely it is wise to give vitamin K_1, but small doses will in most cases be effective. This is because, unless the dose of the anticoagulant has been grossly miscalculated, there is no large accumulation of the anticoagulant in the body which would require large doses of vitamin K_1 to counteract its effect.

The general condition of the patient is also of prime importance in assessing the minimum effective dose of vitamin K_1 required to antagonize the action of anticoagulant drugs. For example, the presence of heart failure, shock, or deficient renal or liver function will mean that large doses of vitamin K_1 are needed if it is to be effective. The only failure met with in vitamin K_1 therapy has been in desperately ill patients who subsequently died within a short period.

It has been shown previously (Toohey, 1952) that 500 mg. of vitamin K_1, given orally, is entirely effective in antagonizing and controlling haemorrhage due to massive doses of such anticoagulants as dicoumarol, phenylindanedione, and ethyl biscoumacetate. Such massive doses of anticoagulants as were used in these experiments would not, however, normally be given in clinical practice; nor, therefore, are

such large doses of vitamin K_1 needed. In the series of experiments under review in this paper doses of vitamin K_1 varying from 5 to 50 mg. were given orally on approximately 96 different occasions to 70 patients on anticoagulant therapy, and as a result it was found that these smaller doses of vitamin K_1 were always effective in counteracting the action of the anticoagulant drugs except in two instances (see later).

Classification of Cases

Most of the uses of vitamin K_1 in anticoagulant therapy may be considered in connexion with the following three groups of cases. Group 1 : Cases of frank haemorrhage or of a severe lowering of the blood prothrombin to a dangerous level in which it is not intended to continue with anticoagulant therapy. Group 2 : Cases of frank haemorrhage in which it is intended to continue with anticoagulant therapy. Group 3 : Cases of severe lowering of the blood prothrombin to a dangerous level, with or without minimal haemorrhagic manifestations, in which it is intended to continue with anticoagulant therapy.

Group 1.—In this group little difficulty should arise. As anticoagulant therapy is not being continued, fairly large doses of vitamin K_1 can be given. If the anticoagulant in use is one of the short-acting variety (phenylindanedione, ethyl biscoumacetate), then 20–25 mg. of vitamin K_1 will be sufficient. If, however, long-acting anticoagulants (dicoumarol, phenylpropyl-hydroxycoumarin, cyclocumarol) are in use, the initial dose of vitamin K_1 should be 25 to 50 mg., according to the degree of haemorrhage. This dose may in a few cases have to be repeated. Doses of vitamin K_1 in the region of 25 to 50 mg. will in nearly all cases result in the blood prothrombin level returning to normal or near normal. In addition, the patient may become refractory to further anticoagulant therapy for some days. As, however, it is not intended to continue with anticoagulant therapy this factor can be ignored.

Group 2.—It is in this group of patients that most anxiety will arise. Here it is essential to give a dose of vitamin K_1 sufficient to restore the blood prothrombin quickly to a safe level. At the same time the prothrombin must be kept within a safe therapeutic range, otherwise a further thrombo-embolic episode may occur. Also, as mentioned above, too large a dose of vitamin K_1 may render the patient refractory to further anticoagulant therapy for a few days. If the patient is receiving the short-acting anticoagulants, 15 mg. of vitamin K_1 should in most cases be enough. Larger doses than 15 mg. should be given only in exceptional cases. If, however, the patient is receiving the long-acting anticoagulants, 15 to 25 mg. of vitamin K_1 should be given, depending on the urgency of the case. The lower the blood prothrombin level, the more severe the haemorrhage, and, most important, the more seriously ill the patient, the larger the dose of vitamin K_1 required. It is in this group of patients with a severe reduction in the blood prothrombin accompanied by frank haemorrhage that most difficulty will arise in estimating the correct dose of vitamin K_1. Frequent blood prothrombin estimations are essential to assess the response to treatment and to decide whether further doses of vitamin K_1 are necessary.

Group 3.—In this group, in which there is a severe reduction in the blood prothrombin, but no or only minimal haemorrhagic manifestations, the urgency and anxiety are not as great as with patients in Group 2. For nearly all patients receiving the short-acting anticoagulants 5 to 10 mg. of vitamin K_1 will be sufficient. Patients receiving the long-acting anticoagulants will need slightly larger doses of vitamin K_1, but it is rarely necessary to give more than 15 mg., at least as an initial dose.

For all patients it is best to assess the response to vitamin K_1 therapy by means of prothrombin estimations taken about eight hours after the initial dose. In patients in Group 3, however, in whom there is no evidence of bleeding, it is usually sufficient to do the first prothrombin estimation after vitamin K_1 therapy the following day if this is more convenient. In Group 2 patients, however, especially those receiving the long-acting anticoagulants, prothrombin estimations should be *routinely* made eight (or even six) hours after the initial dose of vitamin K_1. If an appreciable rise in the blood prothrombin level has not occurred a larger dose of vitamin K_1 should then be given.

Results of Vitamin K_1 Therapy

Given in the doses quoted above, in only 2 out of 70 patients did vitamin K_1 fail to have an effect. Both patients were seriously ill, suffering from myocardial infarction accompanied by shock and heart failure, and both died several days after admission to hospital. It was realized that each was desperately ill, and smaller doses than usual of the anticoagulant drugs were given. Nevertheless, the blood prothrombin fell to a dangerously low level, with microscopical haematuria in one case. Repeated doses of 20 to 25 mg. of vitamin K_1 had only a slight effect in raising the blood prothrombin. At necropsy there was no sign of haemorrhage in either case.

Desperately ill patients with signs of shock and heart failure therefore need initial doses of 25 mg. of vitamin K_1, even when there is little or no haemorrhage, in order to counteract the effect of anticoagulants, especially the long-acting ones. If there is no response to this initial dose—that is, if there is no rise in the blood prothrombin after six to eight hours—then 50 mg. of vitamin K_1 should be given. If a patient fails to respond to vitamin K_1 therapy it is an ominous prognostic sign, and it will be found that most such patients die.

In conclusion it should be stressed that vitamin K_1 is a most powerful drug, and unless the dose is carefully controlled its use will give rise to added difficulties in anticoagulant therapy. Vitamin K_1 should therefore be used only if haemorrhage has occurred as a result of anticoagulant therapy or if the reduction in the blood prothrombin is so great that haemorrhage is very likely to develop. In most patients, except those who are extremely ill, merely withholding further anticoagulant therapy will be enough to raise the blood prothrombin to a safe level without the need to use vitamin K_1. This is especially true when the short-acting anticoagulants are used. With the long-acting cumulative anticoagulants vitamin K_1 therapy will, however, be more often required.

Conclusions and Summary

In 68 patients out of 70 on anticoagulant therapy, vitamin K_1, in oral doses of 5 to 50 mg., was entirely effective in counteracting the action of the anticoagulant and restoring the blood prothrombin to a safe level. In two of these patients in whom slight haemorrhage (haematuria) had occurred the bleeding soon ceased. In only 2 of the 70 patients did vitamin K_1 fail to have effect. Both these patients were extremely ill and died from heart failure and shock following myocardial infarction.

Vitamin K_1 should be used only if haemorrhage has actually occurred or if the blood prothrombin is so low that haemorrhage is very likely to develop. Uncontrolled vitamin K_1 therapy may rescue the patient from the danger or possible danger of haemorrhage, only to render him liable to the risk of further thrombo-embolic phenomena.

In all cases in which it is intended to continue with anticoagulant therapy the *minimum* dose of vitamin K_1 which will be effective in restoring the blood prothrombin to a safe therapeutic range must be aimed at. In assessing this minimum effective dose of vitamin K_1, the general condition of the patient and the type of anticoagulant used are most important, in addition to the actual blood prothrombin level.

Patients receiving the short-acting anticoagulants require only small doses of vitamin K_1 to restore the blood prothrombin to a safe therapeutic level. In nearly all cases 5 to 15 mg. will be sufficient, and it is rarely necessary to exceed 15 mg.

Patients receiving the long-acting anticoagulants require larger doses of vitamin K_1 if the desired effect is to be achieved, but 10 to 25 mg. will usually be enough. The larger doses of vitamin K_1 should be given if haemorrhage has actually occurred or if the patient is desperately ill, especially if there are signs of shock and heart failure.

In cases of frank haemorrhage in which it is not intended to continue with anticoagulant therapy 25 to 50 mg. of vitamin K_1 should be given. The larger dose should be administered to patients who had been given the long-acting anticoagulants and also to the more seriously ill patients.

Response to vitamin K_1 therapy should be assessed by estimation of the blood prothrombin six to eight hours after the initial dose of vitamin K_1. If an appreciable rise in the prothrombin level has not occurred a larger dose of vitamin K_1 must be given.

I wish to thank Roche Products Ltd. for the generous supplies of the vitamin K_1 used in this work.

REFERENCE

Toohey, M. (1952). *British Medical Journal*, 2, 687.

Medical Memorandum

Orthograde and Retrograde Intussusception

Although it is stated that 80% of cases of intussusception occur in patients under 2 years of age, this was not my experience in North Szechwan, China. A number of cases were seen in adults of all ages and some in older children, but none in infants or young children. Although sometimes there was obvious cause such as a pedunculated tumour of the ileum or inflammatory swelling of a mobile caecum, often none was found. The following two cases were different from usual in that both also had retrograde intussusceptions. Although such a condition is not unknown, it seems uncommon enough to merit reporting.

CASE 1

A man aged 24 was seen in the out-patient department on October 31, 1949, complaining of abdominal pain for a little more than a month. He was admitted with a diagnosis of intussusception. Amoeboma was thought to be a possible cause, and therefore general treatment and a course of emetine injections were prescribed. This seemed justified by improvement in symptoms and resolution of the palpable mass, but one week later acute symptoms recurred with an enlarging mass in the right upper abdomen.

Laparotomy was performed under general anaesthesia. There was an intussusception of the terminal 3 in. (7.5 cm.) of ileum into the caecum and ascending colon, almost to the hepatic flexure. In addition there was a reverse intussusception of about 3 in. of the right half of the transverse colon, thus leaving a small length of normal colon at the hepatic flexure. Both intussuscepta were reduced with comparative ease; a lump about the size of a walnut could then be felt in the caecum. An end-to-side ileo-transverse colostomy was then performed. Three weeks later, under spinal anaesthesia, right hemicolectomy was performed, from which the patient made a good recovery.

On macroscopic examination of the specimen the wall of the caecum was found to be much thickened; there was no ulceration or definite tumour. Unfortunately, microscopical examination was not possible.

CASE 2

A boy aged 11 was admitted on November 3, 1951, with a diagnosis of intussusception and acute intestinal obstruction for about one day. During the previous six weeks he had been seen at intervals in the out-patient department complaining of abdominal pain and a lump. Apart from slight distension and poor nutrition, no definite physical signs had been noted. Ascariasis had been treated successfully, and the possibility of tuberculous peritonitis (which is common in the district) had been considered.

On admission he was seriously ill and dehydrated; the abdomen was distended and there was a large firm mass on the left side: this seemed to be a large mass in the left hypochondrium, with a smaller one rather lower and a small gap between. The apex of the intussusception could be felt about 1 in. (2.5 cm.) within the anal canal.

After saline infusion, laparotomy was performed under general anaesthesia (ether with an Oxford vaporizer). Considerable difficulty was experienced in determining the true condition—namely, an intussusception starting in the terminal ileum and traversing the whole colon to the anus; and also a secondary reverse intussusception of the primary intussusception (all three layers) starting about the middle of the descending colon and extending back to the middle of the transverse colon, thus making the big mass palpable before operation. The apex of the intussusception could be reached only with the help of an assistant pressing digitally per anum, but even then reduction could not be effected. With considerable difficulty the secondary intussusception was first reduced by combined movements—digital dilatation of the secondary intussuscipiens, pressure on the secondary apex, and gentle traction. When this was eventually reduced the primary intussusception was reduced with great ease. The gut was carefully examined, but, apart from deep congestion, oedema, and plastic exudate, there was no obvious pathological condition to account for the intussusception, nor was there serious question of viability. The whole colon from caecum to rectum was exceedingly mobile with long mesenteries. The colon was replaced in the approximate anatomical position and the abdomen closed.

The patient made an uninterrupted recovery; two and a half months later he was well and obviously gaining weight.

COMMENT

Aetiology.—The cause in Case 1 was thought to be inflammatory thickening of the caecum, but in several such cases I have wondered whether the caecal thickening was primary or secondary to the intussusception. Histological examination has not been possible. In Case 2 it was obviously a chronic condition with partial resolution over a period of several weeks, possibly initiated by ascariasis; the exceptionally mobile colon can be regarded as a facilitating factor. Disordered peristaltic movements seem the only explanation of the retrograde intussusceptions, though not a complete one.

Treatment.—The remittent course of both these cases raises the question whether intussusception ever undergoes complete reduction spontaneously. At operation one often finds that reduction is comparatively easy except for the last inch or so. Is this the condition during symptomatic remissions? If so, then earlier exploration is called for. In Case 2 the diagnosis was missed and operation delayed till it was almost too late, because insufficient importance was attached to the boy's description and no lump was felt when he attended the out-patient department. It is not usual to do anything to prevent recurrence unless there is an obvious removable cause. Such has been my practice, except that resection, immediate or delayed, has been done in cases with a suspicious lesion in the caecum. This course was successfully followed in Case 1. In Case 2 nothing was done beyond replacing the colon anatomically, in the hope that the exudate would form some anchoring adhesions. The condition at operation precluded anything further, and the subsequent course seemed entirely satisfactory.

F. CHRISTOPHER MADDOX, M.B.

Reviews

KIELLAND'S FORCEPS

Kielland's Forceps. By E. Parry Jones, M.B., B.S., M.R.C.O.G. (Pp. 212; illustrated. 35s.) London: Butterworth and Co. 1952.

The Kielland forceps has climbed slowly to favour. Introduced in 1910 for the delivery of the foetal head arrested in the high transverse position, it at first received scant attention. Soon, however, it was championed by Döderlein and other leading obstetricians, and by the late 1920's it was firmly established in many European clinics. It was in Vienna that I was introduced to this instrument, and in the 25 years since that time I have used it with satisfaction, if not with burning zeal, for transverse arrest of the head.

In present-day practice neither the Kielland nor any other obstetric forceps is used to deliver the head from the brim of the pelvis; Caesarean section is now the method of choice. But for the head arrested in the low transverse position the Kielland forceps undoubtedly has a place, and is an important alternative to manual rotation followed by "ordinary" forceps delivery. In this country the principles behind the Kielland forceps have never been very adequately explained. Some workers have used the instrument like any other for "normal" forceps deliveries; others have restricted it to use in special circumstances. Some enthusiasts have insisted on the original "Kielland method" of application—a method which in unsuitable cases or in unskilled hands may easily lead to a rupture of the lower segment of the uterus. Others—rightly in many instances—have introduced the blades by more conventional methods, but in applying traction have failed to observe other rules on which the advantage and safety of the instrument depend.

An altogether admirable monograph has now come to hand. In a well-documented and reasoned discussion Dr. Parry Jones discusses the history, the theory, the indications, the technique, the dangers of, and the results obtained with the Kielland forceps. Many of his views and arguments apply to forceps in general, but more are strictly applicable to the Kielland instrument. If he overstates his case—which in my opinion he occasionally does—this is an excusable fault in a publication intended to "convert" a new body of obstetricians.

There is little to criticize and much to praise. Dr. Parry Jones has the gift of explaining difficult technical points tersely and clearly. The treatment of deep transverse arrest of the head is fully considered, and a distinction is rightly drawn between this condition and that of deep transverse position of the head. The virtue of the Kielland forceps as an axis-traction instrument, to which Heidler many years ago directed attention, is again expounded. There is an optimistic reference to the correcting of asynclitism by the forceps (pages 72 and 111). I doubt if this is justified: if the position of the head can be so easily altered as is implied, it would seem that "accommodation," moulding, and other changes normally associated with labour have not yet had time to take place. The danger of compression of the foetal skull is emphasized, and the warning given that the forceps handles should not be gripped but that traction should be applied only by means of the index and middle fingers applied over the shoulders of the forceps. The possibility of maternal injury such as the occurrence of vesico-vaginal fistulae is admitted, but it is pointed out that in some of these cases the damage may be caused by the conditions which necessitated the use of the forceps. The claim is made, though I doubt its substance, that there is less chance of causing injury to the foetus, and especially facial injury, if the Kielland forceps is used. More important in my opinion is the care and understanding with which the chosen instrument is used; and here it is pertinent to quote Dr. Parry Jones's own words (p. 55):

"Whenever the obstetrician finds that a reasonable amount of traction exerted in the right direction does not produce descent of the foetal head, he should re-examine to confirm the position of the presenting part. If he is then certain that the foetal head is flexed and is lying correctly, he should conclude that he is faced with a dangerous degree of disproportion and should desist from further attempts at vaginal delivery. The only condition other than disproportion which may be causing difficulty is a constriction ring, and if this has not been relaxed by general anaesthesia and anti-spasmodics it is best to resort to Caesarean section."

Later (p. 73), referring to a head which remains high in the pelvis, he states:

". . . the greatest care is necessary to exclude disproportion . . . the operation should be undertaken tentatively with plans already made to proceed immediately to Caesarean section if the delivery proves more difficult than anticipated. A carefully made tentative pull is without danger to the foetus or to the maternal birth canal. It does not fall within the class of 'failed forceps' cases as ordinarily understood, and might well become an established, although rare, hospital procedure."

This book is convenient in size, and by virtue of the style of writing and the many clear headings is easily read. Numerous diagrams clearly illustrate the arguments presented in the text. Printing errors seem entirely obviated, though there is a mis-spelling of Moloy's name on page 53. There are two appendices: one contains tables dealing with the results of the forceps operation in the Liverpool Maternity Hospital; the other is a translation of the original publication by Kielland entitled "The Application of Forceps to the Unrotated Head; a Description of a New Type of Forceps and a New Method of Insertion."

I regard this as an important publication and strongly commend it to every doctor who gives serious attention to operative obstetrics. While it is particularly concerned with the Kielland instrument, it contains much factual information and wise counsel concerning the use of forceps in general.

J. CHASSAR MOIR.

OBSTETRIC FORCEPS

The Obstetrical Forceps. By L. V. Dill, M.D., F.A.C.S. (Pp. 156; 91 figures. 37s. 6d.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications Ltd. 1953.

This monograph is one of the American Lecture Series and is delightfully printed, illustrated, and bound. Its text, too, is attractive in its clarity and simplicity. The author sets out to cover the history of the development of obstetric forceps as well as the indications, mechanics, and technical details governing the use of various instruments. This is a large subject and it is obvious that in a small book of this kind many of its aspects can be covered only in barest outline. The author has simplified his task, however, by assuming that his readers already have some practical experience, and he aims to give them most help by generally picking out for mention only those forceps which are well known internationally and which are in current use. In this he shows commendable freedom from prejudice. He describes the basic principles governing the use of forceps in relation to the Anderson or Simpson type of instrument, and this is perhaps the best section of the monograph; it is detailed and contains several useful hints. The Tarnier, Kielland, Barton, and Piper forceps each receive a small chapter to themselves, and the description of their particular features and the circumstances under which they may be applied with advantage is generally adequate.

"Forceps should be compared to golf clubs, not to tennis rackets; that is, optimum utility is obtained by a set, not by familiarity with a single favourite." This is the underlying theme of the monograph, but it is open to question and it would be an ideal subject for debate. Practice makes perfect; proficiency in the use of more than one instrument calls for a very large practice and daily opportunities for carrying out forceps delivery in varying circumstances during several years, so that many experts with wide experience are content with one pattern of forceps, and few use more than two. Dr. Dill's arguments may or may not persuade them to change their outlook in this respect. The

book will prove of most value to the specialist and potential specialist, although according to the dust-cover it is also intended for students, house-surgeons, and general practitioners. These last, however, have relatively so few opportunities to practise the forceps operation that most of them cannot expect to become familiar with more than one instrument. A putter is what they require, and if the situation calls for a driver, mashie, or niblick, then surely expert assistance and sometimes another method of delivery are needed.

T. N. A. JEFFCOATE.

SURGICAL TECHNIQUE

Surgical Technique and Principles of Operative Surgery. By A. V. Partipilo, M.D., F.A.C.S. Fifth edition, revised. Foreword by Alton Ochsner, M.D., F.A.C.S. Original illustrations by W. C. Shepard and Hooker Goodwin. (Pp. 704; 548 figures containing 998 illustrations. 110s.) London: Henry Kimpton. 1953.

In this volume Professor Partipilo presents the fifth edition of a textbook of surgical technique as practised in the hospitals of Chicago, but the scope is limited, except for a postscript on the thyroid, to the abdomen and the thorax. Although there are ten other contributors, Professor Partipilo himself dominates the scene, and one cannot but be impressed by the experience and mature judgment which his articles present. Equally impressive is the thoroughness with which every subject is developed, whether it be the tying of a knot, the opening and closing of the abdomen, or the most complex detail of different methods of gastrectomy. Every item is well described and superbly illustrated, so that the details can be grasped at once without any possibility of error.

The standard of all the articles is high, but two appear outstanding—that on the gall-bladder and bile ducts by Oberhelman, and that on duodenal obstruction by Professor Partipilo. The first is not only a most finished article on technique but describes in full detail the variations which may occur, the unusual difficulties which these may present, and the means by which these may be overcome. The second is a most original and interesting contribution to a subject whose importance every abdominal surgeon will appreciate. The whole volume is well produced and the illustrations are superb, combining high artistic skill with obvious appreciation of the surgical problems. It is a worthy tribute to a great surgical school and one for which every surgeon may well be grateful.

HENRY SOUTTAR.

SYNOPSIS OF ANAESTHESIA

A Synopsis of Anaesthesia. By J. Alfred Lee, M.R.C.S., L.R.C.P., M.M.S.A., D.A., F.F.A.R.C.S. Third edition. (Pp. 488. 72 illustrations. 21s.) Bristol: John Wright and Sons Ltd. 1953.

We have much pleasure in welcoming the third edition of Dr. Lee's admirable synopsis. The book has already obtained the reputation of being a compendium of accurate information on all the varied aspects of anaesthesia and analgesia, and the present volume brings this knowledge up to date. The tremendous advances in this subject are indicated by the fact that the third edition has nearly twice the number of pages as the original volume, and it is difficult to see how the author will be able to cope with future progress without considerable omissions. It is quite difficult to pick on a subject connected with anaesthesia, however remotely, which is not found in the excellent index. We note, however, that Dr. Lee does not discuss hypothermia, hibernation, or "lytic cocktails," doubtless waiting to see whether these innovations prove their worth.

This type of book does not give much scope for literary style, since brevity must be the overriding consideration, but in spite of this limitation it is quite readable. The lay-out is good, full use being made of different forms of type in the numerous tables and classifications. Most of the illustrations are printed on glossy paper, which improves their clarity. There is little doubt that this book gives the reader with a basic knowledge of anaesthesia the best value obtainable at the present time.

C. LANGTON HEWER.

CHEMICAL MYSTICISM

The Doors of Perception. By Aldous Huxley. (Pp. 63. 6s.) London: Chatto and Windus. 1954.

Mescalin, used in American Indian religious ceremonies, has fascinated psychiatrists for many years now. This drug can produce schizophrenic-like symptoms in many normal persons, and its near chemical relationship to substances in the body, like tyrosine and adrenaline, has been known for some time. Each new generation of psychiatrists feels this should at least provide a clue to the causation and treatment of certain types of schizophrenia; but so far nothing has come of this hope.

Now Aldous Huxley covers the same ground with a brilliant mind and pen. He compares experiences he had under mescalin with those that have been previously reported in the vast literature of mysticism. He learned how intolerable ordinary living can seem to those to whom even an ordinary chair or a flower becomes so all-absorbing and full of inner meaning, and who cannot switch back to everyday thinking and feeling again. Refuge may finally be sought in suicide, as in the case of van Gogh. Huxley suggests that what has to be done for the insane is to help them to "remain undistracted—undistracted by the memory of past sins, by imagined pleasures, by the bitter taste of wrongs and humiliations, by all the fears, hates, cravings. . . ."

Psychiatrists have to face this problem in treatment every day of their working lives. How is it to be done? After personally experiencing a chemically induced schizophrenia for only a few hours, Huxley returns to some of his earlier "Brave New World" ideas for an answer. Other philosophers, too, might try out the same drug instead of waiting for an attack of the toothache to put their treatment concepts to the test. Huxley argues that if such abnormal experiences can be induced chemically it may sometimes only be possible to use other drugs to relieve them. He discusses some of those now available, and why alcohol, tobacco, and other remedies will continue to be used despite their attendant dangers. Unfortunately only a full posterior leucotomy can as yet produce the result he demands in the quotation given above. He also suggests that mescalin might from time to time be used to give certain people "self transcendence" who are too much tied to day-to-day living to learn other methods of acquiring this, and he feels it to be less open to abuse than other more euphoriant drugs.

This book should be very interesting reading to doctors and especially to psychiatrists. It will make us even more uneasy at our present failure to relieve so much of the mental suffering of our patients, so vividly brought to life by this book. It may put in better perspective our sometimes too detached philosophic viewpoints on such problems. One can only hope it will persuade general medicine to take a greater interest in the physiological aspects of psychiatry, for if drugs so near to adrenaline can create mental disorder others should almost certainly be found to antagonize them. With half the hospital beds in the country filled with psychiatric patients, the Medical Research Council should at least consider spending more than it does out of its annual budget of £1,500,000 on psychiatric research, apart from its purely psychological aspects.

WILLIAM SARGANT.

Methuen's Monographs are extremely handy guides to recent work in fields which touch medicine at many points. They are well documented and slip easily into the pocket. *Sex-Determination* by F. A. E. Crew (third edition, 6s. 6d.); *The Biochemistry of the Nucleic Acids* by J. N. Davidson (second edition, 10s. 6d.); and *Tissue Culture* by E. N. Willmer (second edition, 9s. 6d.) bring the reader thoroughly up to date in these subjects.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY MAY 1 1954

TRICHINOSIS

Infection with *Trichinella spiralis* occurs focally at a low endemic level throughout Great Britain, as shown by Young,[1] but it is only rarely recognized clinically. A recent outbreak of trichinosis in Liverpool, described in the *Journal* this week by Professor Semple and Drs. Davies, Kershaw, and St. Hill, illustrates clearly the characteristic features of the clinical pattern and the epidemiology. The classical course of the infection is a sharp gastro-intestinal upset, with diarrhoea and vomiting beginning one or two days after the infecting meal and followed about ten days later by general symptoms. The initial alimentary symptoms were rarely present in the Liverpool outbreak and elsewhere have occurred in under 10% of cases. As a rule the first signs appear some ten to sixteen days after infection, and they almost always consist in swelling of the eyelids and often of the face, accompanied by remittent fever of 100°–103° F. (37.8°–39.4° C.) or higher. Distressing headache, sometimes associated with photophobia, is common. These preliminary symptoms are rapidly followed by aching stiffness of the muscles, which, when it is detected in the neck, may suggest meningitis. Insomnia is commonly present, even at the same time as lethargy and apathy. Splinter haemorrhages under the finger-nails occur in about 10% of cases and are a valuable diagnostic sign when present. The eyes sometimes show episcleral haemorrhages and a waxy-yellow, swollen appearance of the conjunctiva. Involvement of the central nervous system is common, usually in the form of dizziness or disturbance of balance but occasionally as psychic disturbances or a monoplegia or hemiplegia. A dry cough is often present. Symptoms start to subside about a month after infection, when the adult worms in the intestine begin to die. Myocarditis and derangement of the central nervous system are apt to appear about the fifth week after infection, and in severe cases death may occur. Convalescence is often protracted and normal health may not be restored for some months.

Diagnosis of the first cases in an outbreak is usually established by accident. During routine examination the patient's blood count is investigated and an eosinophilia of 25 to 50% is found. It is this which directs attention to the possibility of trichinosis. Eosinophilia appears about fourteen days after infection, soon after the first appearance of symptoms, and reaches a maximum about the twentieth day. The urine is usually normal, but albumin or blood may occasionally be present for a few hours. The cerebrospinal fluid is always normal. Conclusive proof of *T. spiralis* infection is provided by finding larvae in a small piece of muscle removed from a limb by biopsy. This should be strongly compressed between glass plates and examined directly under the microscope. The larvae resulting from recent infection lie along the axis of the muscle fibres, and they are more difficult to recognize than when coiled or encysted. Heavy infections are rapidly identified by this examination and moderate infections after careful searching. In light infections when direct examination is negative the biopsy specimen should be incubated overnight in an acid–pepsin mixture and the centrifuged deposit examined for larvae. A presumptive diagnosis may also be made by complement deviation, which usually becomes positive during or soon after the third week. This test is not absolutely reliable.

The symptoms and signs of trichinosis can be very diverse, and it may have to be distinguished from typhoid, influenza, acute rheumatic fever, nephritis, exanthematous fevers, and other conditions. Cases which do not show facial oedema but begin with disorders of the central nervous system are not likely to be recognized unless an outbreak of the disease is known to exist at the time. The presence of a marked eosinophilia will help in clarifying the diagnosis and should direct suspicion towards the cause The gastro-intestinal upset immediately after infection will probably be regarded as food-poisoning or a dysenteric attack. The diagnosis is usually not established until general symptoms appear some ten days later.

In Liverpool and in the outbreak in Wolverhampton described by Sheldon[2] the incidence of infection was found to be considerably higher among women than men, though this is not always so. A higher incidence among women results from their habit of eating raw sausage meat. In Sheldon's series 80% were women, and he found that raw sausage meat was eaten by some members of about half the working-class households investigated. In Liverpool, where 75% of the patients were women, 16% of over 3,000 housewives admitted to this habit. Among male cases occupation was an important factor, half of them being concerned with the preparation or sale of pork products. Some of these patients were prob-

[1] *J. Helminth.*, 1947, **22**, 49.
[2] *Lancet*, 1941, **1**, 203.
[3] *J. Amer. med. Ass.*, 1954, **154**, 653.
[4] *Ann. trop. Med. Parasit.*, 1950, **44**, 357.

ably infected accidentally by handling infected pork or by contaminating their food from the knives used in cutting infected pork. Sausages are the principal source of human trichinosis, and only occasional cases are infected from inadequately cooked pork joints.

Personal protection against trichinosis consists in adequately cooking all pork and pork products before consumption. It is a legal obligation on pig farmers that all food should be thoroughly cooked before being given to pigs. Pork which is processed for eating without cooking can be made safe by adequate heating or by rapid freezing to −35° C. for a few minutes or at slightly higher temperatures for a longer time. Recently experiments have been made in controlling trichinosis by irradiating pork with x or γ rays. Gould, Gomberg, and Bethell[3] have reported the effect of γ radiation from cobalt^{60} or from waste fission material in old nuclear fuel rods on infected pork joints of large size. A suitable exposure was found to prevent subsequent maturation of the larvae without affecting the quality of the meat.

One disquieting feature is mentioned in the report on the Liverpool outbreak. It proved impossible to trace back the infected pig beyond the abattoir. Some form of record is required which will permit the tracing of pigs from birth to the consumer so that in the event of an outbreak of trichinosis the infection may be traced to the particular piggery responsible. Griffiths[4] noted the same difficulty in his investigation of the increased incidence of cysticercus bovis in cattle. While it would be difficult to provide a record of the movement of cattle through many hands over some years, it should be comparatively simple to record the movements of pigs, which change owners infrequently and are slaughtered when only a few months old. This matter deserves the serious attention of the Ministers of Health and Agriculture.

THE SMALL-LIST PRACTITIONER

While endorsing in its entirety the Working Party's scheme for redistributing the central pool of money for the payment of general practitioners consequent upon the Danckwerts award, the Special Conference of Local Medical Committees meeting in June, 1952, wisely put in a caveat for those doctors who might be found in the light of experience to be unfairly penalized by the scheme after it came into effect. The Special Conference passed the following resolution:

"That if, when the new scheme of distribution has been endorsed by both parties, it is found in the light of experience that certain groups of practitioners who under the terms of reference of the Working Party might have expected to have benefited have, in fact, not done so, it be left to the Working Party provisionally to allocate an appropriate proportion of the final settlement monies for the purpose of remedying any obvious defects in the distribution scheme, such allocation to be subject to confirmation by the next Conference before it becomes a permanent feature of the scheme."

In the discussions which followed the acceptance of the Working Party's report it became clear that some G.P.s with small lists might be adversely affected by the new method of distribution. But the size of the problem and who would suffer most could not be told precisely until the new scheme was in operation. In accordance, therefore, with the Conference rider quoted above, and at the request of the Ministry and the General Medical Services Committee of the B.M.A., the Working Party was recalled to look at the problem in the light of available evidence since the scheme began on April 1 last year. It has now finished its task, and its report and recommendations are printed in full in this week's *Supplement* (p. 206) as Appendix F of the Supplementary Report of the G.M.S. Committee to the forthcoming Annual Conference of Local Medical Committees which meets on June 3.

The Working Party has examined the remuneration from Health Service sources of those doctors with lists of under 1,200 patients, and of these it has concerned itself with doctors in single-handed practice only. It found that two groups, amounting to some 500 to 600 practitioners in all, could be said to have been placed at a disadvantage by the new arrangements—the first group, a small number who had lost income because of the replacement of their fixed annual payments by the new initial practice allowance; and the second, and larger, group, the elderly doctors. The Working Party's proposals are, therefore, designed to assist both these groups. There are two main recommendations. First, that there should be a basic payment of £250 per annum for single-handed doctors with National Health Service lists of not less than 300 and not more than 1,200 patients. Secondly, and in addition to this basic payment and to the normal capitation fee, there should be a loading of 10s. on each capitation fee for every patient on the list between 300 and 500. But no loadings under the usual arrangements will be paid for patients on the list above 500. Thus a doctor with a list of 300 will get normal capitation fees amounting to £255 plus the basic payment of £250, making a total of £505—an increase on his present remuneration of £250. The doctor with a list of 400 patients will get, in addition to normal capitation fees of £340, the £250 basic payment plus £50 from the special loading on 100 capitation fees—a total of £640, and an increase of £300 on the present. The doctor with 500 patients will

be remunerated on the basis of £425 from normal capitation fees, plus £250 basic payment, plus £100 from the 10s. loading on 200 capitation fees. His total payment will come to £775 and his increase will be £350. Lists from 600 upwards to 1,200 will attract the basic payment of £250 plus the £100-worth of loading from the capitation fees for the 200 patients on the list between 200 and 500: but, since the normal loadings are not to be paid, the increase over the present scale will be a diminishing amount until parity is reached with a list of 1,200 patients. The comparative figures are clearly set out in an explanatory table attached to the report. All payments are to be retrospective to April 1, 1953.

There are certain conditions attached to the proposals. Young doctors previously in receipt of a fixed annual payment will not receive the new payment for more than five years and they must be genuinely trying to build up their practices. Their lists must normally be increasing, and payments will be withdrawn if their lists fall substantially and continually. Elderly doctors must have been in single-handed practice in the same area for at least ten years and must be over 60 years of age to qualify for the new payment. It will be stopped if their lists drop to, and remain below, 300. Eligibility for payment will be reviewed at the age of 70, but will not necessarily cease.

The General Medical Services Committee has already accepted the Working Party's proposals and is recommending them to the Annual Conference. A welcome feature is that there is not that smack of charity about them which in the eyes of many tainted the hardship payments, which they will gradually replace. The new payments are to be made solely in relation to the size of the doctor's Health Service list and without regard to his income from other sources. Furthermore, the cost, which it is estimated will be about £120,000 per annum, will come from money already allocated for the purpose. In any scheme which gives priorities in the distribution of a fixed sum of money—and such a distribution scheme was inherent in the Danckwerts award—it is inevitable that some groups must gain greater advantage. Within the existing distribution scheme these new proposals seem likely to commend themselves to the Conference and to the small-list doctors as a well-thought-out plan to interpret the Conference's wishes fairly.

HAEMOGLOBIN C

In 1949 Pauling *et al.*[1] discovered that sickle-cell haemoglobin (haemoglobin S)[2] differs from normal adult haemoglobin (haemoglobin A)[2] in electrophoretic mobility—that is, in speed of movement in an electric field—and this opened the way for rapid advancement in our understanding of the hereditary haemolytic anaemias. In the same year Neel[3] and Beet[4] put forward the modern interpretation of the genetics of sickle-cell disease: people who are heterozygous for the sickle-cell gene have the sickle-cell trait, which is not in itself a significant cause of morbidity, while those who are homozygous for the gene suffer from sickle-cell anaemia. On this hypothesis both parents of every patient with sickle-cell anaemia should have the sickle-cell trait. In most cases this is true,[5] but undoubted exceptions to the general rule have come to light. It has been found[6,7] that people who inherit the sickle-cell gene from one parent and the thalassaemia gene from the other parent develop a haemolytic disease very similar to sickle-cell anaemia. Then Kaplan *et al.*[8] described a patient with a mild form of sickle-cell anaemia in which the haemoglobin, investigated by Itano and Neel,[9] consisted partly of the sickle-cell type and partly of a new type, which was designated haemoglobin C. The haemolytic anaemia was termed sickle-cell–haemoglobin-C disease. Haemoglobin C is characterized by its electrophoretic mobility, which is distinct from that of both haemoglobin A and haemoglobin S; in other properties haemoglobin C closely resembles haemoglobin A. The presence of haemoglobin C is determined by a single gene, evidently an allele of the gene controlling normal adult haemoglobin synthesis, and inherited independently of haemoglobin S, which is determined by another allele of the same gene. In sickle-cell–haemoglobin-C disease the sickle-cell gene is inherited from one parent and the haemoglobin-C gene from the other parent.

Until 1953 the electrophoretic analyses had all been carried out in the Tiselius apparatus. The introduction of a simple, rapid, and inexpensive filter-paper electrophoretic technique[10-12] has made the study of abnormal haemoglobins possible in many haematological laboratories. Kaplan *et al.*[8] had reported that people with the haemoglobin-C trait (that is, the heterozygous condition) have a few target cells (so called because they look like targets) in the circulating blood but exhibit no other detectable haematological abnormalities. This has been amply confirmed in two recent communications,[13,14] in which investigations of many American Negroes with the haemoglobin-C trait are reported. Each of these papers describes, in addition, a case of haemoglobin-C disease, the patient being homozygous for the haemoglobin-C gene. This disease is characterized by the presence in the peripheral blood film of numerous target cells, anisocytosis, poikilocytosis, and slightly increased polychromasia. A haemolytic tendency is revealed by the somewhat elevated reticulocyte counts

[1] *Science*, 1949, **110**, 543.
[2] Standard nomenclature, 1953, *Blood*, **8**, 386.
[3] *Science*, 1949, **110**, 64.
[4] *Ann. Eugen. (Camb.)*, 1949, **14**, 279.
[5] *Cold Spr. Harb. Symp. quant. Biol.*, 1950, **15**, 141.
[6] *Haematologica*, 1946, **29**, 455.
[7] *Blood*, 1950, **5**, 887.
[8] Ibid., 1951, **6**, 1240.
[9] *Proc. nat. Acad. Sci. (Wash.)*, 1950, **36**, 613.
[10] *J. Lab. clin. Med.*, 1953, **41**, 161.
[11] *J. clin. Invest.*, 1953, **32**, 1070.
[12] *Bull. Johns Hopk. Hosp.*, 1940, **67**, 309.
[13] *Pediatrics*, 1953, **12**, 483.
[14] *J. clin. Invest.*, 1953, **32**, 1277.
[15] *Proc. nat. Acad. Sci. (Wash.)*, 1951, **37**, 775.
[16] *New York Times*, March 28, 1954.

and serum bilirubin. That the haemolysis is due to a corpuscular defect is indicated by the short survival time of the erythrocytes of haemoglobin-C disease when transfused into normal recipients.[13] The haemolysis in both cases was mild, however, and in spite of minor haemolytic crises, with joint swelling, the patient of Ranney *et al.*[14] had survived to 35 years of age, had four uneventful pregnancies, and produced four healthy children. This observation is important genetically, since it establishes that the haemoglobin-C gene (unlike the thalassaemia and sickle-cell genes) is not sub-lethal when homozygous, and has little, if any, adverse effect on reproduction. If haemoglobin-C genes are being eliminated in the Negro population of the United States, this must be mainly due to the failure of patients with sickle-cell–haemoglobin-C disease to reproduce. But the haemolytic manifestations in these cases, of which Ranney *et al.* have seen twelve, are relatively mild. Hence the elimination of haemoglobin-C genes as a result of disease seems to be much slower than the elimination of sickle-cell and thalassaemia genes.

The incidence of the sickle-cell trait in United States Negroes is about 9%,[5] and that of the haemoglobin-C trait is about 1.8%.[12] The expected frequency of sickle-cell–haemoglobin-C disease is 1 in 2,273, and the expected frequency of haemoglobin-C disease is 1 in 11,365 American Negroes. Spaet *et al.* and Ranney *et al.* are to be congratulated on finding their cases against such odds.

Another inherited abnormal haemoglobin type, haemoglobin D, has been identified,[15] and more recently yet another, haemoglobin E, was reported to the American Chemical Society.[16] In five years this field of investigation has grown to occupy a respected place in human genetics and clinical pathology. Many problems remain unsolved, among them why the haemoglobin-C mutation seems to be practically confined to people of African extraction.[12] There is every indication, now that techniques of haemoglobin analysis are generally available, that progress in this field will continue to be rapid.

MELANOCYTES AND MELANOMAS

Melanocytes (otherwise pigmentary dendritic cells) are the cells in skin epithelium which are responsible for cutaneous pigmentation. It was at one time believed that ordinary Malpighian cells were capable of making pigment, particularly after actinic stimulation, but it is now known with certainty that Malpighian cells are only a passive repository of pigment granules synthesized in the melanocytes near by.

The melanocytes of white human skin reveal themselves in transverse section as "clear cells"[1 2]—a term which applies to their appearance but not to their visibility, for they are not easy to see. Indeed, some textbooks of histology disregard clear cells and melanocytes altogether. Until now the omission has perhaps been excusable, for it is only in the last few years that suitable methods have been devised for showing them up. The only satisfactory way of inspecting melanocytes is from the under side of a whole-mount of the epidermis after it has been split away from the corium by some method which preserves both the structure and the vitality of the cells. Such a method has been used for several years by Billingham and Medawar,[2 3] and Mr. G. Szabó, as he describes in a paper published at p. 1016 of the *Journal* this week, has now extended its use to the study of human skin. His photographs of "split" skin preparations impregnated with the "dopa" reagent illustrate the structure, ubiquity, and abundance of epidermal melanocytes. Each melanocyte is a branched cell lying in the basal layer of the epidermis and surrounded by a little cluster of Malpighian cells, upon which its branches end. Mr. Szabó finds that melanocytes vary in number from one person to another and from one part to another of an individual. There are about 1,000 per mm.^{2} in thigh skin (roughly one to every 10–15 Malpighian cells) and anything from 2,000–4,000 per mm.^{2} in the skin of the face and forehead.

These facts should be taken into account in any theory which attempts to account for the different frequencies of melanomas in different parts of the body. There are several by no means incompatible reasons why their frequency should vary from place to place. One is that melanocytes show regional variation in their innate susceptibility to cancerous transformation; a second that melanocytes of different areas are unequally exposed to stimuli (such as irritation or actinic influences) which promote malignant change. A third possibility is that the frequency of melanomas is an expression of the regional population densities of melanocytes. Mr. Szabó's census shows that this third interpretation is anatomically well founded—which is by no means to say that the others are untrue. At all events, no future theory to account for the spatial distribution of melanomas can neglect these differences of melanocyte population density, and much more work is needed of the type that Mr. Szabó has begun.

PRIMIDONE IN EPILEPSY

A new anticonvulsant, primidone, known by the trade name "mysoline," was introduced for clinical trial by I.C.I. in 1949 after extensive experimental trials on animals. This substance is closely linked in chemical structure to phenobarbitone, the only difference being the substitution in the former of an $-H_2$ radical for $-O$ at one carbon atom of a pyrimidine ring. It has already proved an effective clinical agent. The first report of its use by Hanley and Stewart,[1] on 40 patients in an epileptic colony, suggested that it was effective for grand mal and petit mal and also had a beneficial effect on some of the temperamental difficulties shown by epileptics. Butter[2] also gave an encouraging report of its use in a colony. Whitty,[3] using it in neurological

[1] Masson, P., *Spec. Publ. N.Y. Acad. Sci.*, 1948, **4**, 15.
[2] *Philos. Trans. B.*, 1953, **237**, 151.
[3] *J. exp. Biol.*, 1951, **28**, 385.

[1] Hanley, R., and Stewart, A. S. R., *Lancet*, 1952, **1**, 742.
[2] Butter, A. J. M., ibid., 1953, **1**, 1024.
[3] Whitty, C. W. M., *British Medical Journal*, 1953, **2**, 540.
[4] Nathan, P., *Lancet*, 1954, **1**, 21.
[5] Burton–Bradley, B. G., *Med. J. Aust.*, 1953, **2**, 705.
[6] Game, J. A., ibid., 1953, **2**, 707.
[7] Selby, G., ibid., 1953, **2**, 709.
[8] Greenstein, L., and Sapirstein, M. R., *Arch. Neurol. Psychiat. (Chicago)*, 1953, **70**, 469.
[9] Briggs, J. N., and Tucker, J. *Lancet*, 1954, **1**, 19.

out-patient practice, found it benefited both grand mal and to a lesser extent petit mal, and remarked especially that it seemed to reduce both the seizures and the personality difficulties of some patients in the psychomotor group. He found it effective as a symptomatic remedy also in seizures due to cerebral trauma and neoplasm. This was confirmed by Nathan,[4] who also noted that the drug was usually effective within a few days of starting if it was going to be of benefit and that its initial therapeutic effect sometimes became less after a few weeks. Three recent papers from Australia[5-7] confirm these initial findings. However, Greenstein and Sapirstein[8] found it ineffective in psychomotor attacks and sometimes aggravating in petit mal, though this conclusion was reached on only two cases, and is contradicted by the experience of Briggs and Tucker[9] in 22 cases of clinical petit mal. All these authors claimed that attacks were controlled or much improved in 50–80% of cases, and as all used the drug in patients whose disease was unsatisfactorily controlled by other anticonvulsants their results are the more impressive. All report an absence of any severe toxic effects and seem agreed that drowsiness, ataxia, and occasional vomiting are observed early in treatment but are usually transient. Confusional states with adverse personality changes were noted by Whitty, but these also were usually short-lived.

In general it seems clear that primidone constitutes a valuable addition to the medical treatment of epilepsy. It is most convincingly effective in grand mal, and present evidence suggests it may prove more beneficial than most drugs used for the psychomotor group: certainly extensive trial is important here. There is no convincing evidence that it aggravates petit mal; indeed, the weight of opinion is that it may improve this condition also. Dosage is important, because toxic effects are more likely with an initial high dosage. It is probably best to start with half a 250-mg. tablet two or three times a day, and gradually increase this to 3 or 4 tablets a day if necessary. If other drugs are already being used, the dosage of barbiturates should be reduced as that of primidone is increased, since the combination of these two is sometimes extremely soporific. The hydantoins may prove a useful adjuvant to primidone in controlling attacks, though it is best also to reduce their dosage slightly when adding the primidone. Amphetamine can be used here to reduce drowsiness, just as with other anticonvulsants. From the results so far reported, and especially the lack of toxicity, there is a strong case for using this drug as the initial treatment for grand mal and psychomotor epilepsy, combining it with a hydantoin if necessary. In petit mal also, if the "-diones" have proved ineffective, it should be given a trial.

TWENTY-FIVE YEARS OF OPIUM CONTROL

The Permanent Central Opium Board has now been established for 25 years. It began its work in the heyday of the League of Nations and survived the vicissitudes of war into the period of United Nations. The Board, which has its headquarters at Geneva, consists of eight members representing as many countries; its newly elected chairman is Sir Harry Greenfield, the United Kingdom representative. The latest report of the Board[1] describes what has been achieved during the last quarter of a century. When the first statistics were compiled the consumption of opium for non-medical purposes was permissible in eighteen countries and territories of Asia, and in most of these the sale to addicts was a monopoly of the State. By 1953 the consumption for opium smoking and other non-medical purposes had ceased to be legal in eleven of these countries, and the most important of the others are now taking steps to bring such consumption gradually to an end with a view to total prohibition by 1959. The total production of raw opium used licitly for non-medical purposes in 1952 was 166 tons as against 1,585 tons a quarter of a century ago. The world production of morphine at the time the Opium Board was constituted amounted to 55 tons a year, and it was considered at that time that an annual average of 15 tons of the drug found its way into illicit traffic. The production of morphine has steadily increased over the last twenty years, reaching 75 tons in 1952, but 90% of it is used for the manufacture of other drugs, mainly for codeine and ethylmorphine, which are little liable to cause addiction. The production of cocaine in 1952 was only 38% of what it had been in 1929, yet no shortage has been experienced in the licit market. The production of diacetylmorphine (heroin), the drug most favoured by addicts, has fallen even more strikingly. In 1952 the world production was only 3.3% of what it had been in 1929.

Nevertheless, a considerable illegal traffic in drugs of addiction still exists. The clandestine production of Indian hemp, which is the basis of hashish or marihuana, continues to present a serious problem. A large quantity of diacetylmorphine also still finds its way into the wrong hands. So long as this drug is extensively used in medicine there is always a danger of supplies being diverted into the illicit market. The amount medicinally consumed per million inhabitants has fallen markedly over the last six years in Finland, Italy, Sweden, and New Zealand. In the United Kingdom there have been fluctuations, but the amount in 1952 (1.79 kg. per million inhabitants) was the smallest since 1947. Forty-two countries, including Soviet Russia, are listed as no longer using the drug at all, and three others have declared that they are now using up their stocks, and when this is completed the use of the drug will be stopped. Italy is admonished by the Board for having reacted to the discovery of illicit manufacture of diacetylmorphine by suspending only for fifteen days the licence of the firm on whose premises this had been going on since 1948. This, it is pointed out, can only have the effect of encouraging transgressors and might again lead to the creation of centres of illicit traffic. Complaint is also made that Persian statistics are contradictory, and that reporting from certain Asiatic and South American countries is not as regular as it should be.

[1] *Report to the Economic and Social Council on Statistics of Narcotics for 1952, and the Work of the Board in 1953*, United Nations, Geneva, 1953.

CLINICAL PATHOLOGY IN GENERAL PRACTICE
TROPICAL DISEASES IN BRITAIN

BY

A. W. WOODRUFF, M.D., Ph.D., F.R.C.P., D.T.M.&H.

Wellcome Professor of Clinical Tropical Medicine, University of London, at the London School of Hygiene and Tropical Medicine; Physician, Hospital for Tropical Diseases, University College Hospital, London

The problems most commonly confronting the practitioner dealing with patients who have returned from the Tropics are those concerning the investigation of fevers and alimentary upsets. The possible causes of the illness, and therefore the way in which the investigation is conducted, depend to a considerable extent on the time which has elapsed since leaving the Tropics. Thus air travel enables patients to be first seen at the onset of tropical infections with short incubation periods such as primary malaria, sandfly fever, dengue, yellow fever, rickettsial fevers, and bacillary dysentery. Among those falling ill after arrival in this country by sea, malarial relapses, dysentery, enteric fevers, and kala-azar have been most commonly found. Diseases in which the incubation period is long are, however, as likely to occur among those travelling by air as they are in those travelling by sea. Air travel merely adds to the list of diseases it is possible to encounter by reducing the time elapsing between leaving the Tropics and arriving in this country.

Malaria

Malaria is the commonest cause of fever in those who have visited endemic areas less than 18 months before the onset of their symptoms. Awareness of the possibility of the infection is the first step towards its diagnosis, and light might be thrown on many diagnostic problems besides that presented by malaria if an inquiry into the patient's recent movements were made in all cases in which such information is not already known to the practitioner. The two commonest forms of malaria are malignant tertian, caused by *Plasmodium falciparum*, and benign tertian, caused by *P. vivax*. It is important to keep the former in mind, especially with patients who have very recently visited tropical Africa, as unless this infection is promptly diagnosed and treated grave illness with cerebral complications and possibly a fatal outcome may result. Infections with *P. vivax* are more commonly encountered among patients who have lived in the Middle or Far East, and latterly have constituted a special problem in soldiers returning from Korea. In these the possibility of malaria is commonly overlooked, as there may be no history of a primary attack in the endemic region, this having been adequately suppressed by the routine administration of antimalarial drugs. Such patients may have chronic ill-health until the infection is adequately treated. It is important to stress that if *P. falciparum* infections are similarly overlooked the result is usually much more serious.

The Search for Malarial Parasites

In cases in which malaria is suspected, the most important investigation is examination of one or more blood films, and these should invariably be made before treatment is started. Whether they are thought to show or to fail to show parasites they should be retained for possible further examination, as mistakes may be made by platelets or artifacts being confused with parasites. To prepare a blood film is one of the simplest medical procedures, yet it is amazing how seldom it is done well. Microscope slides must first be rendered grease-free, and for this a good method is by washing with "monkey brand" or similar soap, soaking in alcohol, and flaming. A spreader is made by breaking off the corners of a slide after scratching with a diamond. The lobe of an ear or the tip of a finger is then cleaned with spirit or ether. The lobe of the ear is to be preferred to a finger, as it is not only less sensitive to pain than the finger but is also less exposed to infection. Ether is perhaps best for cleaning the skin, as its use reduces the possibility of grease interfering with the spreading of the film. Hypodermic needles are unsuitable for puncturing the skin, for the drop of blood obtained is often too small to make a satisfactory film. A special skin-puncturing needle or, if none is available, a large-sized venepuncturing needle is more satisfactory. A sharp jab causes less discomfort to the patient than a wound made slowly and hesitantly.

Thick and thin preparations should be made, the former by using a pin to smear the drop of blood on the slide over a circular area of approximately ½ in. (12 mm.) in diameter, the latter by spreading the drop with the spreader already prepared. The drop is placed at one end of the slide and allowed to run across the width of the spreader, which is held at an angle of 45 degrees and pushed along the length of the slide. Thick preparations must be allowed to dry thoroughly for 20–30 minutes. Their contained blood is then laked in an aqueous solution of 2% formalin and 1% glacial acetic acid. They are washed in distilled water and stained with dilute Giemsa stain, one drop being added to 1 ml. of distilled water and allowed to remain on the slide for 20–30 minutes before being poured off, and the slide allowed to dry without heating or blotting.

If large numbers of slides are to be stained, Field's method is conveniently rapid and labour-saving. For this a solvent is made by dissolving 10 g. of anhydrous disodium hydrogen phosphate and 12.5 g. of anhydrous potassium dihydrogen phosphate in 1 litre of distilled water. Solution A is prepared by dissolving 0.8 g. of powdered methylene blue and 0.5 g. of azure I in 500 ml. of the solvent. Solution B is prepared by dissolving 1 g. of yellow eosin in 500 ml. of solvent and filtering. Films are stained by immersing in solution A for one to three seconds, rinsing for five seconds in tap-water or in solvent, immersing for one to three seconds in solution B, and washing for three seconds in tap-water. They are then allowed to dry. In using this method films are not fixed and care is therefore necessary in handling them lest they become detached from the slide.

Thin films are most conveniently and satisfactorily stained with Leishman's stain. The slide is covered with undiluted stain, the number of drops required being noted, and after 10 seconds three times this volume of distilled water of *p*H 7.2 is added. This *p*H is obtained by adding lithium carbonate to the water till an aliquot gives a yellow reaction with bromthymol blue. The slide is stained with the diluted stain for 30 minutes and then flushed with the distilled water of *p*H 7.2 and allowed to dry. This method has the advantage of showing up well the Schüffner dots in cells infected with *P. vivax*.

A description of the various malarial parasites is outside the scope of this article, and for that the reader is referred to the standard works on tropical medicine and parasitology. It should, however, be mentioned that, unless parasites are being searched for frequently, errors, even by trained pathologists, are not uncommon. Perhaps the commonest is to regard an artifact as a parasite; less commonly, parasites when scanty are overlooked.

It is often questioned whether antimalarial treatment should be begun before a definitive diagnosis has been

made. There can be no doubt that falciparum malaria in non-immune subjects, if not promptly treated, may give rise to severe and even fatal illness. Thus when it is considered that possible delay in treatment would be dangerous and the blood cannot be examined promptly, it is best to start treatment, though blood films should be made for later examination and confirmation of the diagnosis. To give treatment without awaiting the report on, or making a personal examination of, a blood film may be a method of managing cases in emergency, but it is not a method of diagnosis. If the temperature comes down following treatment in such cases, it is unwise to deduce that malaria was the cause of the fever unless confirmation of the diagnosis is ultimately obtained from examination of blood films. Therapeutic diagnoses of this kind are associated with innumerable pitfalls, and such slipshod methods are harmful alike to the patient and to the profession.

Investigation of Non-malarial Fevers

Non-malarial causes of fever in persons recently returned from the Tropics include bacterial diseases such as bacillary dysentery, typhoid and paratyphoid fevers, brucellosis, tuberculosis, urinary infections, and tonsillitis; protozoal infections such as kala-azar (visceral leishmaniasis), trypanosomiasis, amoebic dysentery, and amoebic liver abscess; and virus infections including the common cold and its upper respiratory complications, especially maxillary sinus infection, influenza, and rarely sandfly and dengue fevers. Typhus and psittacosis are occasionally encountered. These may be confused with malaria, and patients with them have at various times been sent to the Hospital for Tropical Diseases in London diagnosed as cases of malaria. In some such cases slides have been recovered in which artifacts or platelets have been shown to have been wrongly mistaken for parasites. In others no slides had been examined before admission to hospital, but it is remarkable that even so not uncommonly the diagnosis of malaria had been regarded as so incontrovertible that the malaria was said to be of a type insensitive to the drug used. In the Tropics, where the disease is commoner and laboratories may be lacking, or overburdened with work, such errors are more often made. They are responsible for many of the false notions regarding the efficacy of antimalarial drugs which from time to time become widely held.

The investigation of patients presenting with symptoms suggesting dysentery is discussed below. Tests which may help to differentiate malaria and urinary and respiratory infections from the other causes of fever mentioned include the white blood cell count. This should be carried out as a routine; it is usually low in enteric fevers, brucellosis, kala-azar, and sandfly and dengue fevers, and a differential count shows a reduction in the proportion of polymorphonuclear cells. The urine and the deposit obtained from it after centrifuging should be examined microscopically for pus cells and cultured if any are found. In males midstream specimens of urine collected after cleansing the glands may be used for the purpose, in females a catheter specimen is essential. A radiograph of the chest should be taken in all cases in which the cause of the fever is not apparent, even if there are no symptoms or signs referable to the chest.

In cases in which the diagnosis does not become clear as a result of these investigations enteric fever, brucellosis, and typhus must be considered, and blood should be collected for culture, for enteric and brucella agglutination tests, and for the Weil–Felix reaction. For the cultural investigations 5 ml. of blood is added to 100 ml. of broth containing 0.5% sodium taurocholate, and a second 5-ml. sample is added to 100 ml. of plain broth. In taking the blood it is advisable to use a dry sterilized syringe; boiling should be relied upon only in emergencies. It is commonly said that for positive cultural results in enteric fever blood must be taken within the first few days of the attack. This, however, is not strictly true; the chances of obtaining a positive culture at that time are greater than they are later, but positive results may be obtained at any stage in the illness and it is never sound practice to omit this investigation. It is important to inoculate the broth with the blood as soon as it is withdrawn from the vein and to transfer the specimen to an incubator with the minimum of delay. Where brucellosis is suspected the fact should be clearly stated, as cultures should then be incubated in air containing 10% carbon dioxide, for in primary culture *Brucella abortus* will often grow only under increased CO_2 tension. *Br. melitensis* and *Br. suis* will, however, grow satisfactorily in atmospheric air.

Blood for the Widal and brucella agglutination tests and for the Weil–Felix reaction should be collected in a dry sterile syringe and allowed to clot in a dry sterile tube or screw-capped bottle. If the journey to the laboratory is one occupying more than an hour or two, the serum should be pipetted off the blood clot and sent in a sterile screw-topped container or in a sealed glass ampoule.

Kala-azar should be suspected especially in those chronically or intermittently febrile and who have hepatosplenomegaly without marked prostration. Isolation of the causal parasite, *Leishmania donovani*, is the only satisfactory way of making a diagnosis, and it should first be searched for in blood films. In these, however, parasites are invariably scanty; they are more numerous in films of sternal marrow. In making the films it is important for the microscope slides to be absolutely dry, otherwise the parasites will be damaged and may not be recognizable. If examination of blood and marrow films gives negative results, blood should be cultured on N.N.N. (Nicolle, Nory, and MacNeal), Adler's, or Lourie's medium. On these media blood is sown in single drops, and great care must be taken to exclude secondary bacterial infection. The culture is kept at 28° C. and growth is to be expected within three weeks. Material in which *L. donovani* can be found may also be obtained by splenic puncture, but this procedure is best carried out only in hospital and by those trained in the technique. The formol-gel and antimony, or Chopra, tests are useful guides to the diagnosis of kala-azar. These tests are positive when serum globulins are increased, but as this occurs in several other diseases they are not specific. The formol-gel test is carried out by adding a drop of commercial formalin to 1 ml. of the patient's serum, which in positive cases becomes opaque and sets into a gel in 10–30 minutes. In the Chopra test a few drops of a 4% solution of any pentavalent antimony compound are added to a 10% solution of the patient's serum in distilled water. In positive cases the mixture becomes opaque in a few minutes.

Alimentary Disorders

In patients recently returned from the Tropics and presenting with symptoms referable to the alimentary system the most common causes are amoebic dysentery, amoebic hepatitis, amoebic abscess of the liver, and a functional or nervous upset. Less common causes include bacillary dysentery, schistosomiasis, ulcerative colitis, and neoplasms of the bowel wall.

Dysentery

Examination of the stools macroscopically and microscopically will do more to elucidate the diagnosis than any other tests. Thus in bacillary dysentery blood, mucus, or a purulent cellular exudate will be found; in amoebic dysentery exudate is less abundant, the specimen more faeculent, and *Entamoeba histolytica* or its cysts are present. In functional or nervous alimentary upsets the stool may be fluid, semi-formed, or formed—it is not uncommon for several small formed stools to be passed daily. Intestinal spasm may cause the stools to be ribbon-shaped. In such cases there is often an excessive amount of mucus, and sometimes this is passed as casts of the intestinal wall or in long strings.

There is often disagreement on the number of stools which should be examined before a diagnosis of amoebic dysentery

is excluded. Wenyon and O'Connor have said, "If *E. histolytica* are giving trouble, the probability is that amoebae or their cysts will be found at once." Their experience is similar to that of most others practising tropical medicine. Much depends on the skill and experience of the person examining the specimens; if he is fully conversant with the appearance of the parasite and is practised in stool examination, a series of six specimens is usually regarded as sufficient. It should be stressed that, unless a person is examining such specimens frequently, he is liable to commit errors in identification of parasites and objects resembling them, and in view of this it is highly desirable that these investigations should be carried out at a centre established for the purpose. Some advocate that stools should be collected after saline purgation, but the consensus is that purgation does not increase the chances of finding amoebae or cysts; there is also the possibility that salines may destroy amoebae by their osmotic effect.

Cultural methods of isolating amoebae are not recommended for routine use, as it is not uncommon for cultures to be negative even when stools are known to contain the amoebae. Various concentration techniques increase the chances of finding cysts in a specimen, but these methods are not suitable for the isolation of vegetative amoebae, as the latter are destroyed by the solution of zinc sulphate or other salt used in the process. Some state that the chances of finding amoebae or cysts are increased by giving the patient one or two doses of emetine by injection. But no reliable evidence of the effectiveness of this so-called provocative emetine has ever been put forward. It seems probable that such popularity as the method obtained was based on confusion with the use of provocative arsenic in syphilis. Each specimen should be collected in a dry bedpan at room temperature, as parasites may be damaged by undue warmth or by water which sometimes remains in bedpans after they have been washed. When collecting faeces for examination it is important to warn the patient not to micturate into the container into which the faeces are being passed.

Vegetative forms of *E. histolytica* become immobile and disintegrate within a few hours; thus any examination for them must be carried out as quickly as possible. Nevertheless, undue emphasis is sometimes placed on this point. There is certainly no truth in the oft-stated belief that if a specimen cannot be examined immediately it should be kept warm to preserve motility of the amoebae. The reverse is in fact true, for if they are kept cool they remain alive much longer than if kept warm. When chilled, amoebic trophozoites lose their motility, but this rapidly returns when they are again brought up to body temperature. Amoebic cysts remain identifiable for several days in faeces kept in a closed container at room temperature.

In the diagnosis of amoebic dysentery the complement-fixation test is as yet completely unreliable; the same can also be said of barium enemata and other radiological procedures. Sigmoidoscopy is occasionally helpful, but it is remarkable how seldom it affords positive evidence of the disease in cases in which the diagnosis has not already been proved by stool examination. It is, of course, of great value in distinguishing ulcerative colitis or neoplasms of the bowel from dysentery, and negative sigmoidoscopic findings also assist in excluding organic disease. An increasing number of observers are becoming sceptical of small pits in the bowel mucosa as evidence of previous amoebic infection. These received much publicity towards the end of the second world war and were supposed to be the scars of amoebic ulcers. Such ulcers, however, unless of great size, normally heal and their scars completely disappear. In this respect they are similar to abrasions and ulcers of other mucous surfaces and parts of the body. It is probable that many of the depressions to which attention was drawn were the mouths of mucous glands normally present in the rectum and colon.

Thus, in dysentery, the most valuable diagnostic procedure remains the examination of a series of specimens of faeces and particularly of any blood or mucus adherent to or intermingled with such specimens. The specimens are best collected without purgation or the use of provocative emetine.

Amoebic Hepatitis and Liver Abscess

Amoebic hepatitis is usually an accompaniment of an acute attack of amoebic dysentery; its presence is indicated by pain and tenderness in and enlargement of the liver, by leucocytosis, and sometimes by pain in the right shoulder. Acute hepatitis of this kind usually settles down satisfactorily with adequate anti-amoebic treatment and is seldom difficult to diagnose. An amoebic abscess of the liver may, however, cause a more complicated diagnostic problem. Months or years may elapse between the time of the original infection and that at which the first symptoms develop. In some patients there may be no antecedent history of amoebic dysentery, the bowel infection having been subclinical or mild and regarded as transient enteritis only. In the diagnosis of amoebic liver abscess the investigations of greatest value are screening of the liver and diaphragmatic areas, the white blood cell and differential counts, and aspiration of the abscess contents. Stool examination usually gives negative results, for by the time the abscess has developed the original alimentary infection has in most cases been adequately treated or resolved spontaneously. In such cases radiological screen examination usually shows elevation and paradoxical movement of the right diaphragm on respiration. There may also be collapse or patchy consolidation of the base of the right lung. A moderate leucocytosis is usual with some increase of the polymorphonuclear cells, though this is by no means invariable and cases occur in which the white blood cell and differential counts depart but little from normal.

If the clinical picture and/or radiological appearances suggest that a collection of pus is present in the right lobe of the liver, a diagnostic aspiration should be carried out. Aspiration of the left lobe of the liver should not be attempted, as it cannot be reached other than by open operation without incurring risk of damaging vital structures. The right lobe is best aspirated with a large-bore needle introduced in the right mid-axillary line in the ninth or tenth intercostal space or in the right scapular line in the eleventh intercostal space. Any pus obtained should be examined microscopically and cultured. Amoebae are only rarely obtained in such pus, as they live in the abscess wall. Unless there has been secondary infection the pus is sterile on culture. In cases in which it is not infected it is of the same colour as the liver and is commonly likened to anchovy sauce. When infected it has a greenish or yellowish tint.

Schistosomiasis

When schistosomiasis is suspected examination of both urine and faeces is important. Ova of *Schistosoma mansoni* are most commonly found in the faeces or in material removed by biopsy of the rectal wall. Ova of *S. haematobium* are more numerous in the urine though they may be found in the faeces or in rectal mucosa. It is in the last few drops of urine expressed during micturition that the eggs of *S. haematobium* are most numerous. If examination of such a specimen reveals no eggs a 24-hour collection of urine should be allowed to sediment, three-quarters of the collection is then siphoned off and the remainder centrifuged and examined microscopically. In schistosomiasis the differential white blood cell count often shows an eosinophilia. At the Hospital for Tropical Diseases, London, a complement-fixation test for schistosomiasis can be done and this gives reliable results.

Conclusion

The diagnosis in most tropical diseases can be reached by carrying out simple laboratory procedures often involving the use of little more than the microscope, but the interpretation of results and the recognition of the various parasites and or the structures and artifacts which may simulate them call for considerable training and experience. The late effects of errors in interpretation and consequent

mismanagement are not uncommonly encountered at the various tropical centres in Great Britain, and such mismanagement may lead to chronic ill-health and in some cases even to the death of the patient. It is therefore in the patients' interest that whenever possible they should be investigated in a centre for tropical diseases. Apart from various military establishments there are three of these in Great Britain—namely, the Hospital for Tropical Diseases, 4, St. Pancras Way, London, N.W.1.; the School of Tropical Medicine, Pembroke Place, Liverpool; and the Tropical Diseases Unit, Eastern General Hospital, Edinburgh.

Next article on Clinical Pathology.—"Pituitary Function," by Dr. G. A. Smart.

Refresher Course Book.—The first collection of articles in the Refresher Course for General Practitioners (fully revised) are available as a book containing 55 chapters, price 25s. Copies can be obtained either direct from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1, or from booksellers.

MEDICAL ART

[FROM A SPECIAL CORRESPONDENT]

Gaiety once again is the keynote of the exhibition[1] of work by members of the Medical Art Society. Nearly all the paintings evade the criticism of much contemporary art that it cannot be lived with; indeed, any of these would lend distinction to the kind of rooms that most of us are condemned to inhabit. But if the gay spontaneity of this work betokens the amateur, the technique often suggests a more practised hand. Mr. Elliott Blake's impressionist oil painting of autumn leaves in a Sussex lane (No. 23) catches the eye immediately as a fine piece of painting, though the composition is somewhat precisely balanced. Another plastic surgeon, Sir Harold Gillies, also enchants the eye with a landscape of winter, "Beech Trees in Snow" (No. 20). Dr. A. B. Hewlett, as usual, contributes one of the outstanding paintings of the show, "The Upper Reaches" (No. 42), a beautiful evocation in his highly distinctive style of a typical corner of the English countryside. "The Edge of the Downs" (No. 64), by Dr. G. M. Archer, is also a most successful landscape; though more conventional in technique, it glows with unusual warmth of feeling. Other pictures in this room that should not be missed include the two negroid heads by Dr. W. Hartston (Nos. 2 and 6), "Summer Mist" (No. 26) by Dr. E. P. Scott, and "The Reef" (No. 54) by Dr. A. G. Duncan.

Few of these week-end painters—or of any amateur painters in this country—owe much of their technique to any of the artistic movements that succeeded the Impressionists. However, Mr. R. T. Payne shows some fanciful abstractions, attached to rather than illustrating texts from Genesis; Mr. W. M. Van Essen has evidently had an encounter (No. 111), not altogether fruitless, with Picasso; and Mr. Geoffrey Parker's "Bruges" (No. 89), misprinted in the catalogue, suggests some affinity with the German expressionist movement of the 'twenties. Dr. H. Hales's *jeu d'esprit* in wire (No. 80) belongs more to the realm of doodling than of art, but it is an amusing contrivance all the same. On the opposite wall near by is a particularly colourful and decorative painting by Lady Whitby, "Dahlias" (No. 98). Here we are back with the Impressionists again, and it is an easy step to Dr. Joy Patrick's striking portrait of "Cecilia" (No. 107).

Among the water-colours Dr. A. E. O'Donnell shows an excellent snow scene that yet communicates a feeling of warmth derived from the pleasure of painting it. Mr. Holmes Sellors catches the passer's eye with some gay scenes (Nos. 183 and 184), and Dr. Reginald Morshead has recorded Sussex's "Chanctonbury" (No. 171) in a refreshingly cool study. In this same room is a beautiful piece of sculpture by Dr. Geoffrey Konstam, a head of a baby (No. 141). This exquisite work deserves long contemplation.

The president of the society, Sir Philip Manson-Bahr, himself contributes several paintings, in No. 9 giving an agreeable portrait of his horse, and in No. 150 bringing to Sussex an eye that seems to have been averted only momentarily from tropic climes. He and the members of the society deserve our thanks as well as our congratulations for putting on this exhibition of such enchanting talent.

[1] At Walker's Galleries, Bond Street, London, W.1, until May 8. Open 10 a.m. to 5 p.m., Saturdays 10 a.m. to 1 p.m.

THE CHANGING AND THE UNCHANGING FACE OF MEDICINE

FIRST SYDNEY BODY LECTURE BY Sir FRANCIS WALSHE, F.R.S.

The first lecture under the Sydney Body Trust was delivered at Southend-on-Sea Hospital, Rochford, on April 14 by Sir Francis Walshe. This Trust has recently been instituted under a benefaction by Mr. Sydney Body, M.P.S., to provide for a lecture to be given every year designed to promote sympathetic understanding between the medical profession and the public; also a gold medal to be awarded, not necessarily annually, to a medical man or woman for outstanding merit in some field of research or achievement.

Sir FRANCIS WALSHE addressed a large and distinguished audience on "The Changing and Unchanging Face of Medicine." Medicine, he said, was the oldest learned profession in the world, and each successive generation of doctors stood on the shoulders of its predecessors. During the forty years of his own professional life medicine had undergone vast changes, but equally there were aspects of it which had not and would not change.

When he started medicine there was no scientific chemotherapy as they now saw it. Patients suffering from pernicious anaemia survived for about four years, and nothing could check the ruthless course of their malady. Surgery of the lung, the heart, and the brain had developed during his lifetime. The triumphs of asepsis, anaesthesia, and post-operative care had transformed the surgical operation. Preventive medicine had advanced out of all knowledge. The men of his generation in medicine had been privileged to live in an era of more rapid advance than anything the previous history of medicine had seen.

At the same time he looked back occasionally on the doctor of 40 years ago, and realized how often he had possessed that clinical judgment without which none of the modern techniques could be used to full advantage. These modern resources were two-edged weapons, and it was easy for zeal to outrun discretion.

The Impact of the Health Service

Since the introduction of the National Health Service, Sir Francis Walshe continued, many people seemed to have developed an attitude of helplessness concerning their own and their children's health. In former days if a child fell down and grazed his shin his mother bathed it and put on a plaster, but to-day he was sent to join the queue at the surgery. "After all, why do what the doctor is paid to do? We pay for welfare; why should we not have it?"

Doctors were only human beings: they had their private lives, their foibles, too; they sometimes made mistakes. It was not unknown for them to make errors of judgment

when the diagnostic situation was difficult or they were tired or working under pressure. There was too general an assumption that when misfortune occurred someone was to blame. But if such an assumption grew it might well entail a shrinkage on the part of the doctor from taking any bold action at all. He might recall those lines of A. H. Clough :

> Thou shalt not kill; but need'st not strive
> Officiously to keep alive.

"Safety First" was often a miserable motto, but it might be encouraged by the growing practice on the part of patients to have recourse to law.

He sometimes wondered whether judicial pronouncements in cases of alleged negligence or misdoing on the part of the doctor might not be a little more restrained if litigants could proceed against counsel when they failed in their actions, or even against a judge for negligence should his decision be reversed on appeal. But no profession had a keener sense of self-preservation than the law. The lawyers had seen to it that nothing could happen to them.

Corruption by the State

The unchanging face of medicine was its obligation of prudence which the ancients spoke of as practical wisdom and placed in the category of moral virtues. The doctor must be informed in his actions by a wise regard for the individual patient, which did not necessarily mean doing what the patient asked of the doctor. The Hippocratic oath told the doctor in general terms what he might or might not do. Throughout recorded history kings, prelates, and judges had on occasion been responsible for the most monstrous inhumanity to man, but until our own age the profession of medicine had never stained its record in this respect. As a body of men they had endeavoured sincerely to serve the human race. But in Continental concentration camps in the last war they had been made aware of the attempted corruption of the profession by the State, and the abandonment by some members of it of all that the Hippocratic oath involved.

The doctor must refuse to betray his principles at the bidding of any State. He must have the courage and the practical wisdom to use his powers only for proper ends and decline to use them for base ones. It was so easy to believe that what could be done might be done. If we believed that there was a divinity that shaped our ends, it was not for us to rough-hew them how we would. In the world of medicine the moral issue abided. However brilliant in scientific achievement the future of medicine might be, he trusted that the activity of doctors would always be inspired by the moral virtue of practical wisdom, whose name was truth.

Presentation to Dr. William Evans

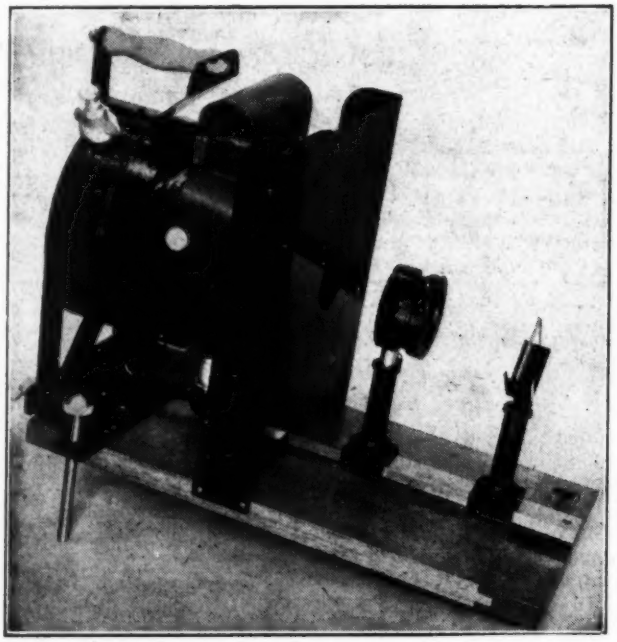
After a vote of thanks had been accorded to Sir Francis Walshe on the proposition of Dr. T. Rowland Hill, Mr. SYDNEY BODY presented to Dr. William Evans the first gold medal of the Sydney Body Trust for his work in cardiology, and spoke of the high esteem in which he was held in Southend and its neighbourhood, and the reputation he had achieved in the field of medicine. Dr. WILLIAM EVANS, in acknowledging the honour, paid a tribute to all those who had helped him, including his colleagues at the hospital and his patients.

A factory for producing D.D.T. will shortly be established in North Ceylon to ensure adequate supplies for the country's antimalarial campaign. Unicef will provide essential equipment costing 250,000 dollars, while the Government of Ceylon will bear capital costs equivalent to 415,000 dollars and annual operating costs of 450,000 dollars. It is estimated that an annual production of 700 tons of D.D.T. will be sufficient for the island's needs.

Preparations and Appliances

A MICROSCOPE LAMP FOR USE IN THE FIELD

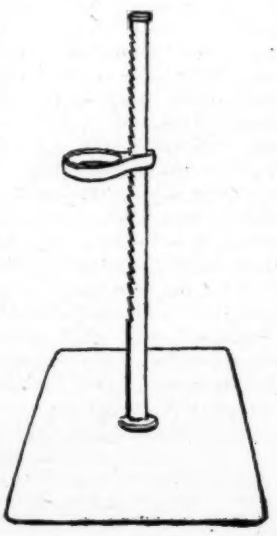
Mr. J. SMILES and Dr. J. A. MCFADZEAN, of the National Institute for Medical Research, London, N.W.7, write: At present there is no satisfactory source of illumination available for microscopy in the field. Six-volt electric lamps may be run from an accumulator, but accumulators are often unreliable, particularly in the tropics, and require



to be charged at intervals. Dr. W. E. Ormerod suggested the use of a Tilley lamp. The photograph shows a paraffin pressure lamp made by the Tilley Lamp Co., Ltd. (model No. AL.21), which has been adapted at the National Institute for Medical Research for use as a field microscope lamp in West Africa. The lamp is mounted on a base in conjunction with a small optical bench which carries a collector lens with a diaphragm, and a filter-holder. There is a metal baffle in front of the lamp, with an opening 2 in. (5 cm.) in diameter, which prevents stray light and heat reaching the observer. The lamp is easily detached from the unit and may thus be used for general purposes. The unit has been tested for transmitted light, dark-ground illumination, and phase-contrast, and is satisfactory for all three systems. We wish to express our thanks to Mr. A. S. Maslen, who constructed the unit.

JACK FOR SUSPENDING THE BOYLE–DAVIS GAG

Mr. W. BRYCE MCKELVIE, consultant E.N.T. surgeon, Booth Hall Hospital, Manchester, writes : The jack for suspending the Boyle–Davis gag in dissection tonsillectomy here illustrated is simple to make and does not include screws or springs liable to rust, or rubber. It is constructed of stainless steel by Allen & Hanburys Ltd. A prototype has been in use for over five years.



Correspondence

Changes in Skin Response in Asthma

SIR,—The place of clinical allergy in medical teaching and practice has long been bedevilled by controversy regarding the methods of investigation and the validity of the results obtained. On the whole, there has been much "false pleading" on the part of the critics, since they have attributed to the allergist much greater confidence in the prognostic significance and validity of skin-test results than he has himself claimed. The immunological validity of these results, on the other hand, can be demonstrated by methods of refined precision, provided that all efforts are made to minimize sources of error in testing. In his article (*Journal*, February 13, p. 370) and in his later spirited reply (*Journal*, April 3, p. 818) to Dr. R. S. Bruce Pearson's pertinent criticism of his technique (*Journal*, March 13, p. 642), Dr. A. G. Ogilvie has arrived at conclusions regarding skin-test results, in the course of which he has employed methods which reduce the reliability of testing. It is as well to point out that there has been concern in recent years over the variability of biochemical and other laboratory investigations as between different laboratories handling the same specimens. The reactions to skin-testing are made manifest by tissue and vascular responses, and careful technique is made all the more necessary.

For precise detailed study, prick testing is a most suitable method, although the incidence of positive reactions may be lower than with intradermal testing. If, however, intradermal testing is employed the ideal method is one in which negative or nearly negative reactions are produced at control tests. Wide experience has shown that the smallest dose consistent with accuracy which can be injected into the superficial dermal tissues is 0.01–0.02 ml. If the injection is given into the deeper layers of the skin reactions can be markedly altered. The dose of 0.1 ml. employed by Dr. Ogilvie's assistants is far in excess of this, and, in spite of his protest to the contrary, this volume injected into the superficial layers of the skin can be both painful and irritant. He describes the disappearance within 10 minutes of the bleb raised by the injection of 0.1 ml. of fluid, and this too is far shorter than the time regularly observed for the disappearance of a similar volume of saline in tests of the absorptive capacity of the skin (Aldrich–McLure test). Even though this volume is too large for test purposes, positive reactions are undoubtedly obtained, but the size of the control reactions vitiates its value for follow-up studies of the variability of skin-test reactions. Even when prick testing is used for threshold testing variability of reactions can be seen. For example, the prick test can elicit reactions with grass pollen extracts containing from 5–10 units per ml., and multiple tests carried out simultaneously can show discernible differences, due either to local skin factors or to imperceptible differences in the prick itself. It would be surprising if differences in intensity of reactions did not appear at tests carried out at different times. This problem has already been considered previously, although Dr. Ogilvie was unable to find any pertinent references, for Vaughan in his *Practice of Allergy*[1] lists variation in intensity of reactions to skin testing in the index, and he gives a tabulated record of scratch-test results to 49 different allergens in the same subject over a period of 12 years. He suggested that tests should be repeated from time to time, since there may be variations in intensity due to technique or to changes in the subject's sensitization.

It would seem then that, whilst there is agreement with regard to the variability and prognostic value of skin-test results, studies, however worthy, which purport to illustrate this should employ the most precise techniques, and should respect the sources of error in testing.—I am, etc.,

London, W.2. J. PEPYS.

REFERENCE

[1] *Practice of Allergy*, 1939. London.

Drinking Sea-water

SIR,—The crossing of the Atlantic by Dr. Alain Bombard on a rubber raft, and his subsequent claims regarding survival methods, have caused much discussion. In particular, his views on drinking sea-water have been widely disseminated, and his heterodox opinions have caused some alarm among those who have responsibilities in advising on survival policy. Dr. Bombard will soon return to this country to give a second series of public lectures, in which no doubt he will reaffirm his belief that sea-water should be drunk by castaways. There has as yet been no public denial of Bombard's claims, and this might suggest that his theories have been accepted. Nothing could be further from the truth, and it seems appropriate to say again that the bulk of experimental evidence has shown that sea-water drinking must do castaways more harm than good.

Criticism of Bombard's physiological notions is often misunderstood as criticism of his achievement. His courage and determination have never been in doubt, and the difficulties he has overcome in his attempts to prove that man can exist for a long period of time at sea are indeed formidable. However, it is not upon psychological issues alone that survival at sea depends. In addition to many other factors, the concentrating power of the kidney, which has a known physiological limit, plays no small part in regulating the conservation of body water. Bombard's advice to drink sea-water is not backed by any acceptable evidence which would show that our present concepts of renal function are inaccurate, and Bombard's own evidence is unsatisfactory and contradictory.

Bombard is wrong when he supposes that traditional advice is based upon the fact that sea-water could not be drunk. The advice given against sea-water drinking depends upon the fact that it *should* not be drunk. The fact is that at the present moment the experimental evidence shows quite clearly that it is possible to drink sea-water but never to advantage. Those who are cast away at sea who do not drink sea-water and wait for the rain that saved Bombard will be more certain to survive than those who do drink sea-water, provided they are equally courageous.—I am, etc.,

T. C. MACDONALD,
Director of Hygiene and Research, Air Ministry.

London, W.C.2.

Action of Chlorpromazine and Promethazine

SIR,—At a discussion on chlorpromazine and promethazine at the Royal Society of Medicine on April 2 Professor J. H. Burn (*Journal*, April 17, p. 931) noticed that little interest was taken in the temperature falls produced by these two drugs. While it is true that a fall of temperature occurs under ordinary methods of anaesthesia, this is not so pronounced as that resulting from chlorpromazine. A drug which produces a marked fall of temperature and presumably reduction in metabolism is surely interesting.

The doses of chlorpromazine and promethazine used in my cases have not exceeded 50 mg. of each drug, but large doses of pethidine (200 mg. and over) or morphine have been given to a number of cases to demonstrate potentiation. The analgesia of both these drugs has been undoubtedly enhanced, but curiously enough the respiratory depressant effects have been reversed. For want of a better term, paradoxical potentiation is suggested. The "'nalorphine'-like" effect of chlorpromazine has restarted respiratory arrest due to pethidine and morphine in every case. The effect of promethazine, however, is unreliable. For instance, respiration was abolished by 200 mg. of pethidine in a fit female with bilateral hallux valgus, artificial respiration being carried out with closed circuit air and basal oxygen. The insertion of towel clips was resented but the respiratory rate was still nil. After 35 mg. of promethazine the skin incision was tolerated, but respiration did not restart. Three minutes after 35 mg. chlorpromazine was given, respiration restarted. The bilateral operation proceeded uneventfully with a respiratory rate of 11 per minute,

and no supplementary anaesthesia was given. In this series (so far) the potentiating effect of chlorpromazine on pethidine or morphine is greater than with promethazine. The effect of chlorpromazine and promethazine on thiopentone is dependent on the amount of pethidine in the mixture.

After 35 mg. each of chlorpromazine and promethazine have been given, respiratory tracings show that little reduction of amplitude occurs after 350 mg. of thiopentone given slowly. In another tracing in which 70 mg. of pethidine was added to the chlorpromazine and promethazine, respiratory arrest occurs with 200 mg. of thiopentone.—I am, etc.,

Edgware, Middx. DAVID RECKLESS.

SIR,—During the past six months I have been able to observe the separate and combined effects of chlorpromazine, promethazine, and pethidine as suggested by Professor J. H. Burn (*Journal*, April 17, p. 931).

When either chlorpromazine or promethazine is given separately by the oral or intramuscular route there is a similarity of the central effect which is characterized by a state of indifference and detachment rather than a true hypnosis and analgesia. However, the action of chlorpromazine is clearly more pronounced in depth and duration, extending fully over 24 hours compared with a maximum of 12 hours with promethazine. The central effect of pethidine on the other hand is predominantly analgesic and sedative. When combined with either chlorpromazine or promethazine each provides a quality that the other lacks, supplementing each other in a most satisfactory manner.

Neither pethidine nor promethazine, separately or combined, have been able to confer protection against haemorrhagic or traumatic shock in the manner obtained when chlorpromazine is added. Neither does either bring about that marked facial pallor and emptiness of capillaries that is characteristic of chlorpromazine and which French workers contend is explained by its strong central sympatholytic action.

There is certainly need for careful evaluation of the precise action of these three drugs. However, I hope that no one will take Professor Burn's suggestion too literally and give a patient 200 mg. of chlorpromazine either intramuscularly or intravenously. A state of permanent "hibernation" might well follow and make Drs. F. S. Preston and H. Y. Wishart's difficulties following a dose of 25 mg. seem quite trivial (*Journal*, March 13, p. 645).—I am, etc.,

London, S.E.11. D. A. B. HOPKIN.

Prostatic Obstruction Due to Ephedrine

SIR,—At last I have seen in print a description of the annoying side-effects produced by ephedrine in elderly male asthmatics, and it has puzzled me for years that this problem has never been fully discussed, or that I have seen no reference to it.

Dr. H. J. Wright, in "Points from Letters" (*Journal*, April 10, p. 878) draws attention to the difficulty of micturition experienced by this group of patients. He attributes the symptoms, which have amounted to acute retention of urine in a number of my own cases, to an effect of ephedrine on the prostate gland. Surely the action is either on bladder sphincter tone or on bladder muscle, or both increasing the former and decreasing the latter. I have based my conclusions on personal observations. Twenty years ago I used to take ephedrine because of hay-fever and noticed a remarkable diminution of the force and volume of the urinary stream. More recently I have seen the same symptoms on taking the amphetamine group of drugs, and it has made me wonder if the benefit claimed in nocturnal enuresis is produced by this "local" action on the bladder rather than by the decrease in depth of sleep, which is put forward as the explanation.

Those people who are predominantly sympathetico-tonic would be particularly affected, the vago-tonics much less so, hence the discrepancies in results reported in the enuretics, and the qualms I feel when I go to bed having left an old man with ephedrine to take for his nocturnal wheezing for the first time.—I am, etc.,

Ilminster. HUGH CARTWRIGHT.

SIR,—In answer to Dr. H. J. Wright (*Journal*, April 10, p. 878) I would refer him to Hale-White's *Materia Medica*,[1] which mentions the fact that urinary retention may occur with ephedrine medication, particularly in children. I have myself on occasions seen acute retention in adults as a result of heavy ephedrine medication.

I have, on several occasions, seen elderly males admitted in a state of left hypertensive failure associated with bronchospasm who have, as an incidental finding, a retention of urine due, probably, to ephedrine therapy which has been given before admission for the bronchospasm.—I am, etc.,

Liverpool, 6. WILFRED FINE.

REFERENCE

[1] *Materia Medica*, 1952, revised by A. H. Douthwaite. London.

"New Cure for Gastric Ulcer"

SIR,—Some time ago you wrote to me about rumours of a new vitamin allegedly discovered by me. These rumours have now culminated in the statement in the lay press that I have announced the discovery of a new dietary factor which cures gastric ulcer in humans in 10 to 30 days. I have not made such an announcement. And I should like to disclaim any responsibility for it and the accompanying sensationalism.

For a number of years I have studied the dietary development and prevention of gizzard ulcers in chicks, a subject which may or may not be related to the human ulcer problem. At present certain dietary materials (not "new vitamins") that counteract gizzard ulcers in chicks are being tested for their value as dietary constituents in the treatment of gastric ulcer in man. An American gastro-enterologist is studying the problem, and several Danish physicians have begun clinical trials too.

Since, to my knowledge, no clinical reports have appeared in the medical literature, newspaper articles about "the cure for ulcer," and, concomitantly, direct or indirect advertising of preparations purported to cure the disease, are, to say the least, premature.—I am, etc.,

Copenhagen. HENRIK DAM.

Dangers of E.C.T. in Elderly Psychotics

SIR,—Whilst agreeing with Dr. G. I. Tewfik (*Journal*, April 10, p. 876) in his criticism of the statement by Drs. Vera Norris and Felix Post (*Journal*, March 20, p. 675) that "fainting turns, transitory pareses, or speech disturbances . . . even in the absence of neurological signs or patchy intellectual defects, was regarded as indicative of cerebral arteriosclerosis," I cannot agree that the concept of arteriosclerotic dementia is based on shaky pathological and clinical criteria. Certain clinical pictures correlate too well with the necropsy findings of atherosclerosis in cerebral vessels coupled with areas of cerebral infarction on microscopic examination, or even gross cerebral haemorrhage or cyst formation,[1] deposits of iron in the extrapyramidal system and senile plaques in the cortex. Many old patients suffering from cerebral arteriosclerosis are labelled senile dementia.[2]

Clinically, cerebral arteriosclerosis should be diagnosed by emotional lability, patchy amnesia, confusion, relatively well-preserved personality, and retention of insight, with some evidence of generalized arteriosclerosis, or focal signs in the C.N.S. I do not think one should be so enthusiastic about giving E.C.T. in such cases, because the increased metabolic demands resulting may precipitate a prolonged amnesia; I have known such patients die from left ventricular failure due to coronary ischaemia, even when treatment has been modified by succinylcholine chloride.—I am, etc.,

Willerby, Yorks. F. HOUSTON.

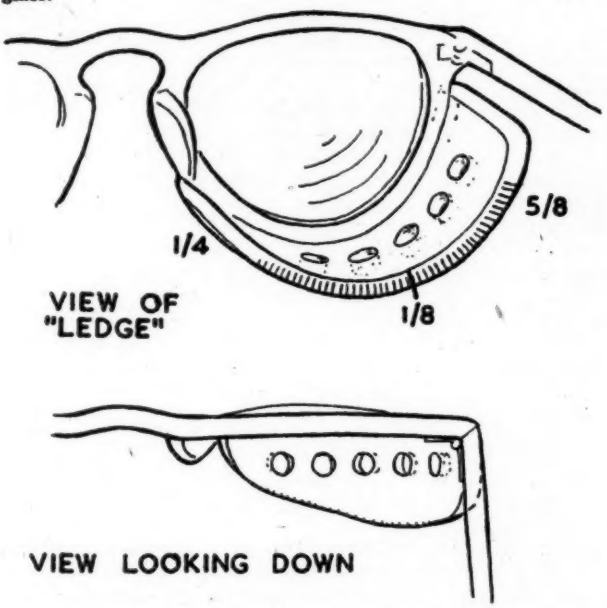
REFERENCES

[1] Boyd W. (1947). *Textbook of Pathology*. London.
[2] Strassmann, G., and Krush, T. (1947). *J. Geront.*, 2. 45.

Relief for Entropion Sufferers

SIR,—For about three years I have suffered from entropion with the resultant constant irritation by the hairs of my lower lid on the cornea. A first-class oculist on two occasions removed skin below my lower eyelid. Neither operation proved successful and indeed each time he informed me that they might not be.

About eight weeks ago a lay friend, who observed me constantly drawing down the lower lid, suggested that if I wore an eyeglass frame inside my glasses it might be helpful. For some reason I was unable to keep the frame in situ. I asked an optician to fit a "ledge" along the lower right eyeglass which by its weight would fit snugly on to my cheek and so keep the lower lid everted. The ledge is ⅜ in. (16 mm.) at its widest part, tapering to about ¼ in. (6.4 mm.) at its narrowest, and ⅛ in. (3.2 mm.) thick. It lies slightly more than at right angles to the rim of my glasses. It is slightly serrated on its edge and has perforations along its middle to prevent condensation on the eyeglass.



This idea may have been used before, but neither my oculist nor other doctors to whom I have shown it have ever seen it. I have now perfect comfort and am free from all irritation. I will be glad to know if such a treatment for relief from entropion has been previously tried.—I am, etc.,

Dublin. CECIL W. C. ROBINSON.

Pregnancy Following Haematosalpinx

SIR,—In the medical memoranda (*Journal*, October 10, 1953, p. 814) Dr. J. G. Dumoulin reported a case of pregnancy following haematosalpinx, and he commented on his failure to find a similar case reported in the literature.

On November 6, 1944, a girl of 16 was admitted to hospital with a history of lower abdominal pain and dysuria. She had never menstruated. She had a mid-line tumour arising out of the pelvis and was diagnosed as a case of congenital retention of the menses. At operation dense tissue replacing the lower part of the vagina was incised and a haematocolpos was reached at a depth of 1½ in. (3.7 cm.). About 18 ounces (0.5 kg.) of an odourless, more or less tarry fluid was evacuated. The cervix was patulous and admitted a No. 7/8 Clifford and Walls dilator. A bimanual examination showed a uniformly enlarged uterus, and a tubal swelling on the left side. The enlarged uterus was a haematometra which was draining slowly. A new introitus was fashioned by undercutting the lower end of the vaginal skin and suturing it to the edges of the original incision. The abdomen was then opened with the intention of dealing with a suspected haematosalpinx by salpingectomy. There was a little dark free fluid in the pelvis. The right tube appeared to be normal. On the left side was a haematosalpinx which seemed to be getting smaller when it was exposed and handled. An attempt was made to reduce the size of the haematosalpinx still further by milking it gently towards both ends. Although there was no further reduction in size, the decision to remove the tube was revoked and the abdomen was closed. After a follow-up examination on December 15, 1944, I never saw the patient again. Mr. O. Vaughan Jones, of Bangor, has very kindly traced this patient for me and has written to tell me that she has had normal deliveries of full-term live infants in 1949, 1951, and 1953.

Dr. Dumoulin mentions the fact that most textbooks only briefly describe haematosalpinx from congenital vaginal atresia. Many British textbooks are either silent or equivocal on procedure. W. Shaw[1] recommends salpingectomy. Conservation of the tube is suggested by Eden and Lockyer.[2] American textbooks are much the same. In successive editions of Curtis (now Curtis and Huffman[3]) there has appeared a drawing of a specimen of haematocolpos, haematometra, and bilateral haematosalpinx—"removed from a girl of fourteen." Te Linde,[4] however, states clearly that "one should be restrained from doing salpingectomy. . . ." Well-known Continental authors like Martius[5] and Guggisberg[6] advise salpingectomy. In their classical paper "Congenital Retention of the Menses," Christie Brown and Alan Brews[7] collected and analysed 50 cases in 21 years in the largest teaching hospital in London. Of the 50 cases, only 7 had a haematosalpinx. In the 7 case notes of haematosalpinx, Christie Brown and Alan Brews record that 3 were unilateral and 4 were bilateral (there was another case of a ruptured tube that might have been another unilateral haematosalpinx). This illustrates the rarity of the condition and possibly explains the dearth and conflict of advice on what should be done.

In these days when the possibility of infection should not influence the operator one can at least make a plea for conservation of the tube in cases of haematosalpinx from congenital atresia of the vagina.—I am, etc.,

Carmarthen. J. R. E. JAMES.

REFERENCES

1 *Textbook of Gynaecology*, 1952, p. 144. London.
2 *Gynaecology*, 1935, p. 168. London.
3 *Textbook of Gynaecology*, 1950, p. 707. London.
4 *Operative Gynaecology*, 1953. London.
5 *Die Gynäkologischen Operationen*, 1950, p. 315. Stuttgart.
6 *Lehrbuch der Gynäkologie*, 1946, p. 62. Basel.
7 *J. Obstet. Gynaec. Brit. Emp.*, 1930, 37, 233.

Domiciliary Obstetrics

SIR,—In his account of obstetric practice in the Gloucester area, Dr. Ivor Cookson (*Journal*, April 10, p. 841) has rightly pointed out several dangerous types of patient who cannot safely be confined at home. But I think that he has made some unjustifiable assumptions from the data which he has examined, and has painted altogether too idyllic a picture of the ease with which domiciliary midwifery can be practised. Dr. Cookson says: "It does not need postgraduate experience to select for hospital, women who have had many previous deliveries and those with a history of an abnormal third stage. . . . Interest in obstetrics and adequate instruction as a student are the only essential qualifications for the family doctor who wishes to practise obstetrics in an area where consultant support is available." He has, I think, forgotten how much or how little knowledge a student possesses after his final examination. Such a student is uncertain about his findings on abdominal examination, and more so about those on vaginal examination. He will quickly forget much that he has learnt unless he is practising it daily. In theory, he can easily book a patient for hospital confinement if she has a history of post-partum haemorrhage, provided he recalls that this is an indication for delivery in hospital and remembers to ask her if she has such a history: he can send her to have her breech delivery in hospital, provided he has diagnosed breech presentation correctly. Every student should know that a vaginal examination must not be performed on a patient with antepartum haemorrhage

in her own home, yet the number of such patients arriving at hospital who have been examined vaginally is still appallingly high.

To someone like Dr. Cookson, who has postgraduate experience of obstetrics and is continuing to practise it, such counsels of safety are readily appreciated. He knows the danger of neglecting these precautions because he has seen the accidents which follow; but the doctor who has not seen them, but has merely been told that they occur, will appreciate them less readily, and will much sooner forget them. I doubt if such a doctor will, for long, resist his patient's insistent demands to have her twins delivered at home. We all have a strong tendency to hope that everything will be all right. Even in his personal cases, Dr. Cookson states that "it was decided with some reluctance to deliver one breech and two sets of twins at home." The inexperienced doctor might easily decide to do so too, but would not be able to deal with intrapartum haemorrhage from premature separation of the first placenta by rapid extraction of the second twin, as Dr. Cookson did. He says also of his difficult cases: "All these could, of course, have been transferred to hospital." Why, therefore, was this not done if it is so simple and advisable? The statement that pelvic contraction "is rare and likely to become rarer" may be true of some areas of the country. It is certainly not so of others. In the industrial areas of the North of England and in Scotland, pelvic contraction is still common and a most serious danger, especially in multiparae, in whom it is most likely to be overlooked.

His article states of forceps extraction: "Domiciliary forceps delivery is inevitable in a small proportion of cases, but the risks are not great." Now, the simplest rule which the adequately instructed student should know is that forceps should never be applied until the cervix is fully dilated; yet in an industrial area of the north where consultant support is easily obtained the commonest cause of failed forceps is incomplete dilatation of the cervix (Gadd, *Journal*, March 27, p. 735). Surely there can be no other reasonable explanation for this than that the doctor without practical experience has failed to recognize the degree of dilatation of the cervix. The fact that forceps are still being applied under such circumstances and that grandes multiparae and patients with a history of post-partum haemorrhage are still commonly confined at home seems to indicate to me that something more than simple teaching is required to convince most doctors of the dangers of such practices. Dr. Cookson admits that it will take an average doctor ten years to accumulate records of 150 cases. He will require better experience than this to make him convinced of what he is feeling on abdominal and vaginal examination, and to give him the skill to interpret his findings correctly.

Not only is it necessary for the practitioner in the country districts to have experience in obstetrics, but also for his colleague in the less remote areas to have it too in order that he can recognize when consultant help is required. It will not matter how much consultant support is available if such support is not asked for.—I am, etc.,

Sheffield, 3 C. J. DEWHURST.

SIR,—Dr. Ivor Cookson is to be congratulated on his revised version of his Sir Charles Hastings Clinical Prize Essay (*Journal*, April 10, p. 841). It well deserved your careful and important leading article (p. 861). The essay succeeds in demonstrating the excellent results which can be obtained in domiciliary obstetrics by a general-practitioner obstetrician who has some training and obviously exceptional enthusiasm. There will be much agreement with his conclusions on the selection of cases for hospitalization, but there remains a strong case for having all primigravidae under the care of a hospital, if only for the earlier detection of pre-eclampsia and a more energetic management of this complication in its earliest phases. The hospital would be much concerned with weight increase and with the labile blood pressures and take action on these findings. It is true that we now see fewer cases of "contracted pelvis," but we are still meeting disproportion in small women and dystocia arising from perversions of pelvic shape. Further, though few primigravidae in respect of their pelves rate a "trial of labour," all are very much on a trial of the uterus and a trial of the soft tissues. Tables VI and X, dealing with delayed labour and perineal damage respectively, demonstrate this clearly.

It seems likely that the demand for confinement in a hospital will not diminish while the present differential maternal mortality as between hospital series and domiciliary series persists. In this area (Stirlingshire and Clackmannan) between the years 1947 and 1951 inclusive there were 10,570 institutional confinements with 5 maternal deaths and 12,195 domiciliary confinements with 20 maternal deaths. This gives maternal death rates of 0.46 per 1,000 and 1.64 per 1,000 respectively. Professor Baird[1] showed a very similar disparity between the two forms of service for Aberdeenshire and Aberdeen City for 1946–50. At a meeting of the Edinburgh Obstetric Society during this session it was stated by an official that the domiciliary maternal death rate for Scotland at the present time was four times higher than for the institutions.

Baird in the same article declared that maternal mortality in well-equipped hospitals could possibly fall to about 0.25 per 1,000. I believe that the domiciliary maternal death rate can also be reduced, but the general-practitioner obstetrician carries three severe handicaps. First, very few practitioners carry a "giving" set and a suitable fluid with which to combat haemorrhage and shock. A great deal of experience as well as matched blood and an armamentarium are required to deal satisfactorily with the haemorrhagic emergencies which are now the chief cause of death. Secondly, few general practitioners are alert to note the onset of pre-eclampsia early enough and to act vigorously at once. For this, teaching is probably at fault. We should be taught that pre-eclampsia (meaning oedema, hypertension, and albuminuria) is an end-state of which in most cases there has been adequate warning, and that complete pre-eclampsia practically never can be cured and not often ameliorated until the pregnancy is terminated. Thirdly, the presence or intercurrent onset of anaemia in pregnancy is not sufficiently regarded. Especially the onset of anaemia after infections—for example, after pyelitis—too often escapes notice and greatly intensifies the effects of haemorrhage, shock, and toxaemia. The simplest haemoglobinometry would suffice, since great accuracy is unnecessary.—I am, etc.,

Stirling. D. S. GREIG.

REFERENCE

[1] *Hlth Bull. (Edinb.)*, 1952, **10**, 51.

SIR,—I was most interested in Dr. I. Cookson's article on domiciliary obstetrics (*Journal*, April 10, p. 841), but would like to inquire on one or two points which seemed not quite clear.

It is stated that most general practitioners will be able to apply forceps, yet admitted that this is not taught in the curriculum; where has this art been learnt? A little later the inexperienced practitioner is advised to call a consultant with little or no hesitation; the busy consultant, however understanding, is surely not likely to encourage this practice. Suturing the perineum, it is stated, should be taught to students. I considered myself fortunate to perform one such operation during my midwifery training. Thus I and my contemporaries can hardly be considered competent to suture perineums on our own.

Would Dr. Cookson agree with me that the best way of overcoming these difficulties could be to serve six months as obstetric house-surgeon prior to starting a career in general practice?—I am, etc.,

Digby, Lincs. P. WINTERSGILL.

Nocturnal Enuresis and Frequency

SIR,—With regard to nocturnal enuresis, apart from the usual effort along the lines of altering the drinking habits, or the use of phenobarbitone, ephedrine, nicotinic acid, or amphetamine sulphate, I have during the past six years made considerable trial with posterior lobe pituitary snuff ("disipidin"). The patients take a pinch of the snuff at night, and thus get the benefit of renal inhibition during the next five to seven hours. On the whole small children have not done so well with the snuff, but in older children or in cases in the second and third decades I have found it very useful.

My best case is a man of 36 who, since using the snuff, has been able to cut down his "accidents" from about every night to one or two a month. He has got married on the strength of this, and has been using it successfully for three to four years, but if he stops using the snuff he relapses.

I have also used the snuff to relieve nocturnal frequency in elderly patients where other measures fail and where their rest is seriously disturbed by having to micturate at frequent intervals. I have found it most effective in these cases, and have several very grateful elderly men who, by using the snuff, cut down the nightly disturbances from five to two times to one or two. I have never seen any written reference to the use of this snuff for such cases before, but so far, from my own experience, I have encountered no unpleasant effects from its use.—I am, etc.,

Clitheroe. R. E. A. S. HANSEN.

Retention of Urine

SIR,—Mr. J. A. Lloyd Davies (*Journal*, April 3, p. 796) has drawn attention to the increased risk in operating on prostate cases when they are in a state of bladder distension with overflow or acute added to chronic urinary retention, and has shown the high proportion of cases which come to hospital in the more dangerous conditions.

In the Victoria Infirmary, Glasgow, and Hairmyres Hospital, Lanarkshire, 770 patients have had operations for prostatic obstruction in the last five years: 412 cases (53.6%) have been admitted in acute retention. In many cases it is not possible to say whether there was chronic retention before the acute attack. Ninety-six cases (12.4%) had bladder distension with overflow, and 262 cases (34%) had chronic retention and difficult micturition. In the last group both clinical features were usually present; in some, one or the other predominated. These figures show a close relationship to the corresponding ones given by Mr. Lloyd Davies—53.6, 12.4, 34; 52, 13, and 35%.

Mr. Lloyd Davies points out that many patients fail to seek advice about apparently mild symptoms. He attributes this failure to ignorance of the great advances in the surgical treatment of prostatic obstruction. I believe that another factor is equally important. Many patients, and some of their doctors, believe that a consultation with a surgeon is equivalent to making arrangements to have an operation. They have known men who have had mild bladder symptoms for very many years and never suffered anything more than minor inconvenience. The significance of mild bladder symptoms in an old man can only be assessed by the intelligent interpretation of the history, rectal examination, intravenous urography with post-micturition film, and the bacteriological examination of the urine. We cannot expect to have patients referred for the investigation of mild urinary symptoms until patients and their doctors realize that an operation will be advised only when there is good reason to believe that the symptoms will increase in severity and become a danger to life.—I am, etc.,

Glasgow, C.3. T. L. CHAPMAN.

Strangulated Hernia

SIR,—In answer to Mr. V. J. Downie's letter (*Journal*, April 10, p. 877), 28 infants in our series were treated by emergency operation and 17 were treated successfully by sedation and gentle taxis.

With regard to the second question: two infants only had an elective operation within a few months of the successful reduction of the incarcerated hernia by conservative means. Recurrent incarceration was found in one infant only, this a few hours after conservative treatment had been successful. In view of the fact that recurrence is unusual, elective herniotomy is not essential, but in practice the repair of an infantile hernia is such a safe operation in good hands that we feel that it should certainly be performed as soon as the patient's condition allows—usually a matter of a few days.—We are, etc.,

Penarth, Glam. JOHN RENDLE-SHORT.
C. HAVARD.

Single Incision for Bilateral Orchidectomy

SIR,—I was dismayed to learn from his letter (*Journal*, April 17, p. 934) that Sir Heneage Ogilvie advocates a scrotal approach to the testis, and I hope that young surgeons, particularly when dealing with such conditions as spermatocele, hydrocele, etc., will not be tempted to revert to this technique. Of course, one feels that Sir Heneage speaks with his tongue in his cheek, for how else could one account for the remark: "Nature pushed the testicles into the scrotum: why pull them out, trim *or enucleate them, and then push them back again*?" (the italics are my own).

Twenty-five years ago I learned from bitter experience that the position and the corrugated surface of the scrotum hampered efficient pre-operative cleansing and the maintenance of post-operative asepsis. In a large series of cases I recorded far fewer complications and a shorter period of hospitalization after inguinal than after scrotal incisions. As regards the risk of haematoma, it must be remembered that in the inguinal approach oozing is only likely to occur from the coverings of the testis. When the scrotum is incised, however, there is the added fear—in spite of drainage—that blood may infiltrate quite extensively between its layers. I would never agree that oozing following the scrotal approach was "harmless." Personally, I limit direct exposure to cases in which there is either a fluctuating abscess or a sinus connecting the organ with the skin surface.

Finally, if a good cosmetic result were the only matter of importance, how could one improve upon a neatly sutured inguinal incision situated entirely within the pubic hair field?—I am, etc.,

Swansea. C. J. CELLAN-JONES.

The False Positive Jelly Test

SIR,—I have now collected 33 children out of a group of 550 who have a positive tuberculosis jelly test. All of them have a negative Mantoux reaction and show no radiological evidence of tuberculosis in the lungs. All of them exhibit clinical signs and symptoms of a catarrhal state of the upper respiratory tract and are prone to develop febrile catarrh. This condition is thought to be due to a hitherto undetected virus.[1] These same children are most frequent victims of acute inflammatory disease in tonsils, adenoids, and middle ear clefts.

In the opinion of the writer, the correlation of a positive tuberculosis jelly test with a stereotyped clinical syndrome and a predictable natural history are not fortuitous. This acceptance of the "false positive" is obstructing a new avenue of investigation. Perhaps others have noted and searched for the significance of these positive jelly tests in the absence of classical tuberculosis and would be able to enlighten the writer?—I am, etc.,

Harold Wood, Essex. P. D. MULKERN.

REFERENCE

[1] Stuart-Harris, C. H. (1953). *Influenza and Other Virus Infections of the Respiratory Tract*. London.

Cortisone and Carcinogenesis

SIR,—In relation to your leading article on "The Pituitary and Carcinogenesis" (*Journal*, February 6, p. 321), may I report the following case?

Twelve years ago a woman, then aged 45 years, was operated on for carcinoma of the breast and a radical mastectomy was performed. About the same time she began to suffer from recurrent attacks of bronchial asthma and from the onset was under my continuous observation at the allergy clinic of the Hadassa Municipal Hospital, Tel Aviv. She was one of the severest cases in my practice and visited the clinic frequently. Eighteen months ago she began taking cortisone tablets (generously supplied by her relatives in the U.S.A.), and became so used to them that hardly a few days passed without her taking tablets (cortisonism). In all she had about 15 g. of cortisone. In May, 1953, radiological examination showed no evidence of pulmonary pathology. In September, 1953, an ulcer appeared in the operation scar, which on biopsy proved to be metastatic

carcinoma. Radiological examination at that time showed pleural effusion with disseminated infiltration of both lung bases. The patient died in March, 1954, but unfortunately a necropsy could not be performed.

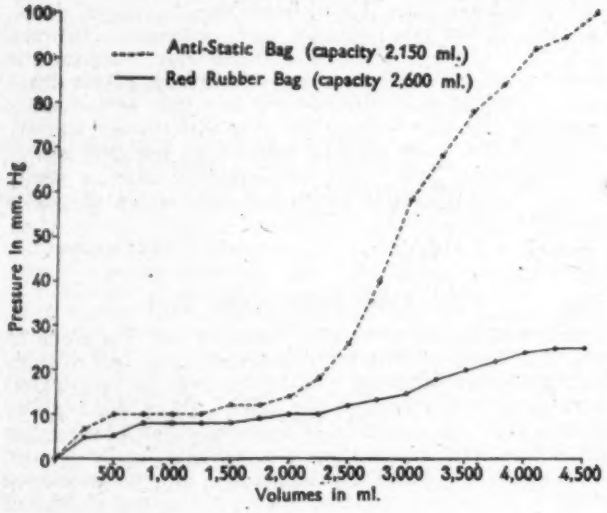
I wish to report this case for the sake of record only, and do not draw any conclusions. Have similar cases been observed ?—I am, etc.,

Tel Aviv, Israel. N. LASS.

Distension Pressure in Rebreathing Bags

SIR,—The physical characteristics of the anti-static rebreathing bags which are in current use on anaesthetic machines are of some concern to anaesthetists. That there is some danger in their resistance to distension we have for some time been aware, but to what extent this would influence the pressure in the system in the event of an expiratory valve sticking or being accidentally left screwed down has not been the subject of precise examination.

Similar tests were made with a red rubber rebreathing bag and an anti-static bag as follows. A rubber bung bearing two glass tubes was wired into the neck of the bag. The tubes were brought out through another rubber bung in the neck of a large aspirating bottle. The aspirating bottle was inverted and filled with water and a bicycle pump and valve attached to one tube and a mercury manometer to the other. When the bag was inflated it floated upwards and had room to expand freely, displacing its volume of water through the tap (now uppermost) at the bottom of the aspirating bottle. The graph shows the results. The pressures recorded before the bags were full are mainly hydrostatic.



Dangerous pressures may therefore easily and rapidly develop in the system when anti-static bags are in use.—I am, etc.,

Edinburgh, 3. J. G. ROBSON.

Change of Sex

SIR,—Everyone will agree with your correspondent, Dr. A. P. Cawadias (*Journal*, April 10, p. 876), regarding intersexuals and hermaphrodites, on which he is an acknowledged expert, but for him to class transvestists as a form of intersexuals surely shows a grave confusion of thought. No one so far has managed to discover an endocrine basis for homosexuality,[1] and how much less is such a basis to be found in the considerably less abnormal transvestist. He does not tell us to what writers he is referring when he says that "we find definite endocrine, genital, and other physical stigmata pointing to a definite intersexuality." Over the past twenty years I have seen as many transvestists as anybody in England, and a large number of these were seen in conjunction with Mr. L. R. Broster, but we have never noticed these "physical stigmata."

Transvestism is a psychical disease related, to some extent, to homosexuality—some homosexuals are transvestists, but not all transvestists are homosexual.[2] If this is the case—and to anyone who has had a chance of studying the psychosexual constitution of these people it obviously is so—then the abnormal minds should be treated in order to conform them with the normal body and not *vice versa*. For it must be accepted that it is impossible to change a person's sex. It is true that we can castrate a man, inject oestrogens and so on to enlarge the breasts, but this is not a transformation, it is a mutilation. Why is this mutilation contemplated ? So that the patient can pose as a woman—which he is not—and wear female clothes.

There is nothing in the law of England which states that a man must not wear feminine clothes, but the police arrest anyone so doing for "insulting behaviour likely to lead to a breach of the peace." The right course, therefore, is to modify the conduct of the police so that they adopt a more tolerant attitude. This, surely, is more desirable than that men should be maimed and mutilated into travesties of the opposite sex, and to my mind it is derogatory that medical men should be asked to cut off or put on sexuality like a jobbing plumber lays on gas or water.—I am, etc.,

London, W.1. CLIFFORD ALLEN.

REFERENCES

[1] Swyer, G. I. M. (1954). *Practitioner*, 172, 374.
[2] Allen, Clifford (1949). *The Sexual Perversions and Abnormalities*, p. 145. Oxford University Press, London.

*** This correspondence is now closed.—ED., *B.M.J.*

"Edwardian" Adolescents

SIR,—The stimulating leading article on adolescence (*Journal*, March 27, p. 748) omits, I think, one factor of great importance. This is the driving need felt by a large proportion of adolescents, particularly male adolescents, for emotional adherence to a group with a ritual. It is this drive which has so often proved both the danger and the strength of insurgent political bodies. In Garibaldi's days it led British youth to Italy, and later it formed the core of the blackshirt movement in Great Britain. Surely it is an inadequate description of a dominant quality of adolescents to concentrate wholly upon training and give no place to the consideration of the need for emotional expression.

In primitive communities the need of adolescents for training, for ritual, and for identification with their future life as adults is recognized as an integral part of the life of the community, and in the national outlook of a civilized society this need is forgotten. A need, however, denied legitimate expression and honourable integration with society finds its own ways to satisfaction, and we are now seeing a very curious form of this satisfaction in the odd appearance of small groups of youth in the self-invented uniforms of a travesty of male Edwardian masculine attire. These groups, armed sometimes with razors, show the force of adolescent need for ritual by the invention of a queer, creeping, circular "dance" which seems to be part of their characteristic. In a big city it seems natural that all variants of behaviour should appear, but the fact that these "Edwardian" creepers are now appearing in small country towns some distance from the city should surely convince us that it is time to take this phenomenon soberly and to direct some attention to it.

Are these youths wage earners, and can they pay the cost of their equipment ? An odd phenomenon is therefore before us: do the parents of the boys meet the expense of their "Edwardian" clothes, and, if so, what sort of parents are these ? Can the general practitioner help us here ? Have any of the readers of this *Journal* families under their care whose sons have been drawn into or who lead these groups ? Could they tell us something of these families ? Will not the sociologists help us in study of this emotional chicken-pox of the community ? Cannot we do better for our lads than this ?—I am, etc.,

London, W.11. MARGARET LOWENFELD.

Depression Treated by E.C.T.

SIR,—I read with interest the letter of Dr. S. Karagulla (*Journal*, March 13, p. 646) and well remember the flutter in the dovecotes of the protagonists of E.C.T. produced by her article in the *Journal of Mental Science* four years ago.[1] In the evaluation of treatment of depressive states by E.C.T. it is necessary, as she says, to have an adequate control group, and her series from 1930 to the time of introduction of E.C.T. provides that control group.

In 1941 I described the recovery, etc., rate in a series of 212 consecutive cases at the Latchmore Hospital, Ham Common, for mentally affected officers in the 1914–18 war, all of whom I saw from beginning to end of their hospital career, excepting a few remaining after October, 1919.[2] The rates were : recovered 60.4%, relieved 17.5%, not improved 19.8%, died 2.3%. These 212 were of course of different types, including schizophrenics and paralytics, who lowered the recovery rate. The material was usually good, most cases were young, many were exhaustion cases, and a good recovery rate was to be expected. Although occurring so long ago, they may be considered, like Dr. Karagulla's earlier cases, as a control group. In the annual report of the Board of Control for 1952 the number of direct admissions is given as 66,773, of whom 16,552 were discharged as recovered, about 25% ; and 29,052 were, however, discharged as relieved, about 45% ; combined rate of discharge 70%. In 1921, the recovery rate was 32.5%, and had been much the same for many years previously. In 1946 the relieved rate practically equalled that of the recovered, combined 62%, as compared with 48% just before the Mental Treatment Act of 1930.

I must say I was surprised at the low recovery rate of 1952, and can only presume there must have been a greater proportion of senile admissions. The high relieved rate, I believe, is due to the large number of voluntary admissions. I think it is generally conceded that many more comparatively mild cases are now sent to mental hospitals, although these milder cases do not necessarily have a better prognosis as regards recovery.

My impression is that the value of E.C.T. has been overrated, with the possible exceptions of involution cases, and I agree with Dr. Karagulla that a critical review of physical methods of treatment is necessary. Indeed, Mr. Harvey Jackson, in an article on leucotomy, suggests that electro-convulsive therapy has been responsible for much atrophic change, possibly arising out of repeated diffuse petechial haemorrhages.[3]—I am, etc.,

Hastings. HARVEY BAIRD.

REFERENCES

[1] *J. ment. Sci.*, 1950, **96**, 1060.
[2] Ibid., 1941, **87**, 109.
[3] Ibid., 1954, **100**, 62.

Dangers of Induced Hypotension

SIR,—It is a relief to read Dr. Harry F. Griffiths's letter (*Journal*, March 20, p. 706) giving support of the technique of induced hypotension. During the past three years I have personally employed this method using hexamethonium bromide in 250 patients, for the operations of radical mastectomy, block dissection of glands of neck, major plastic repairs, prostatectomy, vaginal hysterectomy, and colporrhaphy. No serious complications have arisen, and I have met with no catastrophes, nor delayed ill effects which might be attributed to the anaesthesia. I have been much impressed by the excellent operating conditions, by the reduction in operating time, and by the satisfactory post-operative condition of the patients.

Is it not possible that the deaths reported with induced hypotension might have been largely due to unsatisfactory anaesthetic technique associated with the induced hypotension, rather than the hypotension itself ? The following case illustrates how readily induced hypotension might have been incorrectly blamed for a post-operative hemiplegia. In December last the patient, a woman aged 63, with a B.P. of 220/120, had a wide excision of malignant melanoma of cheek, and a graft. The anaesthetic was given by a registrar and induced hypotension was not used. On the third day this patient developed a sudden hemiplegia. She came to the theatre again last week, having partially recovered from the hemiplegia, for a block dissection of malignant glands of neck. The B.P. was 215/120 and I hesitated as to the advisability of using induced hypotension, but decided in favour, and employed my usual technique. The total dose of hexamethonium bromide used was 20 mg. Conditions were satisfactory, the systolic pressure remaining between 80 and 60 throughout the operation lasting 1¼ hours. The patient was returned to the ward with a systolic B.P. of 60, and the foot of the bed slightly raised. One hour later the B.P. was 95 and it gradually returned to the previous level over three days. It is now ten days since operation and there has been an uneventful recovery.—I am, etc.,

Manchester, 3. FLORENCE FAULKNER.

Medical Needs in the Gold Coast

SIR,—The Council of the Gold Coast Branch of the British Medical Association has read with interest the recent correspondence on the medical needs in the Gold Coast. It is suggested that members of the Association wishing to come to the Gold Coast should communicate with the secretary of the local Branch, as conditions in the Gold Coast are changing daily. I would do my best to supply any information about local conditions that may be required.—I am, etc.,

P.O. Box 297, Accra. M. J. COLBOURNE,
Secretary, Gold Coast Branch.

Clergy and Doctors

SIR,—No one who has been in general practice can fail to realize that there are many problems that affect both doctors and clergy. Have we not all had patients whose complaints start from worry over some moral problem—perhaps one which they would rather disclose to us than to a clergyman ? And do not the clergy constantly hear details of illness ? There is surely overwhelming need for co-operation between us.

I would, however, suggest to the Rev. Tony Clemens (*Journal*, April 24, p. 983) that whilst co-operation must take place in the hurly-burly of parish and practice, it should not begin there. There are many difficulties to be faced—not merely those of preserving confidence—and I would suggest that the best way to begin would be by quiet thought and discussion in a small group of clergy and doctors, where difficulties could be foreseen and personal idiosyncrasies ironed out.—I am, etc.,

East Hoathly. F. GRAY.

London Medical Orchestra

SIR,—Congratulations to those who are responsible for the formation of the new London Medical Orchestra. Their inaugural concert on Saturday, April 3, showed a wonderful degree of precision, confidence, and musicianship under an evidently first-rate conductor. Not even a hint of the untidiness so noticeable in the writing of prescriptions. Without derogating the strings, I was particularly impressed with the quality of the wind playing, as it is on the whole harder to come by amateur wind players than strings. It is invigorating to meet with busy practitioners able and willing to devote leisure to so admirable a pastime—a real recreation for themselves and for us, their appreciative colleagues. I hope they enjoyed it as much as I did. I am glad to hear that they mean to aid medical charities. These will get more of my money than before. Good luck to these blenders of cures and keys.—I am, etc.,

London, W.12. R. PATRICK ROSS.

Obituary

COLIN D. LINDSAY, M.D.

We record with regret the death on April 19 at his home at Plymouth at the age of 82 of Dr. Colin D. Lindsay, a Past President of the British Medical Association.

Colin Dunrod Lindsey (he changed his name to Lindsay in 1926) was born on May 22, 1872, his father being Assistant Commissary General to the Indian Army. From Plymouth College he went on to study medicine at St. Mary's Hospital, qualifying M.R.C.S., L.R.C.P. in 1894. He took the London M.B. in 1898, and proceeded to the M.D. six years later. After qualification he held the appointment of junior demonstrator in anatomy at St. Mary's Hospital Medical School, and later became house-surgeon at Horton Infirmary (now Horton General Hospital) at Banbury in Oxfordshire. He then returned to Plymouth and settled in general practice. Always keenly interested in diseases of the lungs, he was appointed assistant physician to the then South Devon and East Cornwall Hospital in 1913, becoming senior physician in 1926, and succeeding the late Dr. A. B. Saltau as principal senior physician in 1930. When he retired in 1937 the title of emeritus physician was conferred upon him. He was also for many years consulting physician to the Royal Eye Infirmary, Plymouth, and to Tavistock Hospital. Dr. Lindsay always strongly supported the proposal that the three voluntary hospitals in Plymouth—the South Devon and East Cornwall, the Royal Albert Hospital in Devonport, and the Central Hospital—should be amalgamated, but it was not until 1934 that the complicated negotiations were completed and the Royal assent given to the amalgamation.

During his long life Dr. Lindsay took a leading part in medical affairs in Plymouth, and was chairman of the Plymouth Division of the B.M.A. from 1929 to 1931 and president of the South-western Branch in 1933–4. He was also a past president of the Plymouth Medical Society. When the Annual Meeting of the British Medical Association was held at Plymouth in 1938 the nomination by the local executive committee of Dr. Lindsay as a suitable candidate for the Presidency of the Association was received with unanimous approval. His address was on the always topical subject of the relationship between the profession and the public, and his remarks are as apposite now as they were sixteen years ago, for they crystallized the opinions of a man of great practical wisdom and common sense who had been in practice for forty years both as a general family doctor and as a consultant physician. Under his guidance and by his example the Plymouth Meeting was a particularly happy and successful one.

Dr. Lindsay married the youngest daughter of Colonel Henry C. Creak, of the Bengal Cavalry: she survives him, together with one son, Mr. Donald Lindsay, who became headmaster of Malvern College last year, and one daughter.

Dr. STEPHEN M. DAVIDSON writes: Rarely can it be said that a man had no enemies, but with Colin Lindsay one can go further and say that everyone who came in contact with him admired and respected him. To his patients he was not only their trusted physician, he was their friend. To his colleagues his advice was sound and marked by considered restraint, and also by his ability to respect the viewpoint of the younger generation. Colin Lindsay was a man with great moral courage, high principles, and a strict ethical code, and these virtues were warmed and made lovable by his grand sense of humour, which endeared him to young and old alike. He was one of the last consultants who engaged in general practice—a factor which enhanced his value to the general practitioner and the patient, and enabled both to benefit from his humanity and far-sightedness. His forte lay in diseases of the chest, and for many years he was the leading figure in the work and organization of the old tuberculosis dispensary in Plymouth and was the first in the district to collapse a lung. Those who were fortunate enough to work with him have lost a colleague whose like will never be seen again; whose honesty was forthright; whose courtesy was old-fashioned and charming; and whose wisdom was profound and liberally leavened with humour.

H. T. EVANS, D.M., M.R.C.P.

Many former students of the Welsh National School of Medicine will have learnt with deep regret of the death of Dr. H. T. Evans, consulting physician to the Cardiff Royal Infirmary, on April 7 at the age of 80.

Herbert Thomas Evans was born on December 4, 1873, near Corwen, Merionethshire, the youngest of the three sons of the Reverend David Evans, who later became vicar of Dolanog, Montgomeryshire. He received his early education at Bancroft's School, London, and at Christ College, Brecon, and then entered Jesus College, Oxford, with an exhibition in mathematics. His first profession was that of schoolmaster, and he held posts at Christ College, Finchley, and then at Talmont, in Scotland. He then decided to become a doctor and studied medicine at St. George's Hospital Medical School, obtaining the B.M., B.Ch. degrees of Oxford as well as the M.B., B.S. degrees of London University in 1912. His first medical appointment was that of house-surgeon at the Radcliffe Infirmary, Oxford, and shortly afterwards, in 1914, he was appointed assistant physician to the King Edward VII Memorial Hospital, now known as the Cardiff Royal Infirmary. In the same year he obtained the M.R.C.P., and in 1915 proceeded to the D.M. In the first world war he served in the R.A.M.C., first in France and later at Milton Hill Hospital. His services were recognized by the award of the King Albert Medal by the King of the Belgians.

Dr. Evans, despite his small stature, was a keen athlete: he created a record for hurdling at his school which remained unbroken for several years. From an early age he derived great pleasure from exercising his skill as a fisherman, and he also spent much time walking and cycling, pastimes which gave him ample opportunity to indulge in his fondness for nature studies. He often visited the Continent, and for many years went to Switzerland regularly for winter sports.

During his early years as an assistant physician to the Cardiff Royal Infirmary Dr. Evans also held an appointment as demonstrator in the department of anatomy, where his patience, tact, and kindness to students in their early years, and his sympathetic approach to their problems, endeared him to all. As a physician he devoted himself with skill and understanding to the care and interest of his patients, and he rarely missed an attendance at hospital in the days when such services were rendered voluntarily. Although of a shy and retiring disposition, he was always ready to help those who sought guidance or advice. His professional ability, integrity of character, and honesty of purpose gained for him the admiration and respect of his colleagues, students, and nurses. When the British Medical Association held its Annual Meeting at Cardiff in 1928 he served as a vice-president of the Section of Diseases of Children. He retired from the Cardiff Royal Infirmary in 1939, but he remained in private practice and was able to continue to walk long distances and to cycle until the onset of his fatal illness some six months before his death. Dr. Evans was married, and the sympathy of his colleagues is extended to his widow in her great loss.—L. H. H.

THOMAS CARNWATH, D.S.O., D.Sc., M.B., D.P.H.

Mr. S. T. IRWIN writes: I first met Tom Carnwath, whose obituary was printed in the *Journal* of April 17 (p. 937), when he entered the old Queen's College, Belfast, in October, 1896. He was then a conspicuously handsome young man, tall and straight, with jet-black wavy hair, a small moustache, and expressive features. From the first he took a prominent part in all student activities, especially the Students' Union, which was opened in January, 1897. He was a keen but not very successful athlete. His outstanding ability allowed him to spread his interests while still leaving him supreme in the examination-room. His personal charm made him popular in all student gatherings, then almost entirely male, but made him perhaps even more admired at evening mixed parties.

He was not an entrance scholar, but the following year, when he transferred from arts to medicine, he was awarded a first-year scholarship in literary subjects. By then he had established himself as one of the first men of his year, and scholarships followed year by year. He interrupted his medical course to read science, with chemistry as his main subject, in which he graduated with first-class honours. Automatically he therefore became senior scholar in chemistry in the session 1900–1, and the following year was elected to the Dunville studentship, the most valuable prize then in the gift of the College. Returning to medicine, he served as resident pupil in the old Royal Hospital in Frederick Street, and graduated with first-class honours in the Royal University in 1903.

After qualification he did not, I think, seek a hospital resident post, but became demonstrator of anatomy under Symington. At the same time he joined a brilliant coterie of young men who surrounded J. Lorrain Smith in the pathological laboratory. These were Tom (afterwards Sir Thomas) Houston, R. J. (afterwards Sir Robert) Johnstone, and John C. Rankin (still happily with us). This was at a time when bacteriology was in its infancy but was beginning to attract many of the ablest of the younger men. They worked far into the night, and I believe it was a great occasion when John Rankin first demonstrated the *Spirochaeta pallida*. It was here that Carnwath made up his mind to devote himself to public health, and, by the influence of Lorrain Smith, obtained the 1851 Exhibition, which took him to Hamburg and Berlin, where he worked in the years 1905–6.

After retirement in 1940 he came back to live in Northern Ireland and devoted his attention to his old school, which by this time had become Queen's University of Belfast. He received the coveted honorary degree of D.Sc., and represented Convocation on the Senate and on many of its committees, especially the Board of Curators, where he showed his wide knowledge and sound judgment in the making of appointments to the teaching staff. At first these were purely university posts, but later they extended to the joint appointments scheme of the university and the hospitals authority, a method of dealing with clinical teachers still peculiar to Northern Ireland.

Dr. W. V. TOTHILL died at his home at Capetown on March 25 at the age of 67. Though he had more than his fair share of illness and operations during the past two and a half years, he never complained and his courage was an example to all who knew him. Walter Vincent Tothill was born on April 15, 1886, and qualified L.M.S.S.A. from the London Hospital in 1913. After qualification he just had time to take a post as ship surgeon to Australia and act as a locum in a few practices before war broke out in 1914, and for the next four years he served with the R.A.M.C., first in West and then in East Africa. After the war he became the first British medical officer in Tanganyika, a position he was reluctantly forced to relinquish after an attack of blackwater fever. When he had completed the tropical diseases course in London and recovered his health, he returned to the Tropics, against medical advice, and spent fifteen happy and useful years in Trinidad, doing postgraduate work in Austria and Russia when on long leave. Again ill-health made a change of climate advisable, and to the sorrow of his patients—black and white, poor and rich—he left the West Indies and bought a practice in Western Australia. Before he could begin his new work he was involved in a car accident which resulted in a maimed left hand, among other injuries, and meant that it was useless to keep a practice where surgery brought in half the income. Eighteen months later he accepted the position of medical officer to the British Phosphates Commissioners on Nauru Island, in the Central Pacific, where he thoroughly enjoyed the work. But the entry of Japan into the last war enforced the evacuation of most of the Europeans and the Chinese labourers to Australia. On arrival in Australia he was asked to accompany the Chinese to Central Australia, and he worked there for two years under the greatest difficulties and in the utmost discomfort. When able to leave he went to New Zealand, where he put in eight years of useful medical and social work, until ill-health obliged him finally to retire from practice. His book, *Doctor's Office*, was written while convalescent after the car accident, and another, in an equally amusing vein, was written during his last illness and is being prepared for publication. He is survived by his widow, who, as Bridget Ristori, was formerly matron of the Colonial Hospital, San Fernando, Trinidad.

The death occurred at Aberdare on March 23 of Dr. M. LL. JONES in his 86th year. Martin Llewelyn Jones was born on August 28, 1868, the eldest son of the late D. W. Jones, J.P., of Aberdare, and was educated first at a private school and later at Perry's School, Cardiff. Receiving his medical training at St. Bartholomew's Hospital, he qualified M.R.C.S., L.R.C.P. in 1890 at the early age of 21. Three years later, after passing the Fellowship examination of the Royal

College of Surgeons of England, he found himself in the somewhat unusual position of having to wait until the prescribed age of 25 before being admitted a Fellow. Not many months before his death he received congratulations from the President and Council of the College on having completed 60 years as a Fellow. After qualification he held several resident appointments at St. Bartholomew's Hospital. He was always particularly proud of having been house-surgeon to Sir Tom Smith, who was Surgeon to Queen Victoria. Llewelyn Jones's qualities and qualifications might well have taken him to a high place in the wider world, but his home town and its surrounding hills and its people had a strong pull for him, and, returning to Aberdare to practise in 1894, he led a full and active life until his enforced retirement due to blindness in 1944. Taking the first steps in co-operation with the Powell Duffryn Company and the miners, he was one of the founder surgeons of the Aberdare General Hospital, a project which in the early years of the hospital and throughout his active life was very near to his heart. His experience was great, and, though recognizing keenly his responsibilities, he was a fearless and skilful operator: there are still many older patients who remember with gratitude his skill and kindness. He was medical officer to the Post Office for many years and a medical referee under the Workmen's Compensation Acts. He had a wide and expert knowledge of literature, for he was an avid reader with a remarkably retentive memory. Owing to a busy practice his recreations were of necessity curtailed, but he loved to fish and was an expert shot. He was confined to his house for the last four years of his life, but older townspeople still remember vividly his tall, straight figure, fine bearing, and grave but courteous manner, for he was a man of most distinguished appearance, the personification of what a doctor should look like in the eyes of the layman. He married Ethel, second daughter of Mr. and Mrs. Brunel White, of Carmarthen, in 1906, and she survives him together with two sons, the elder an ophthalmic surgeon at Salisbury, the other a solicitor and town clerk of Durham.

Dr. H. P. JAMESON died very suddenly from coronary thrombosis at his home at St. Albans on March 31. He was 50 years of age. Harold Parnell Jameson was born at Edgbaston, Birmingham, on February 29, 1904, and was educated privately and at Birmingham University, where he had an outstanding career as a medical student. He graduated M.B., Ch.B., with first-class honours, in 1925 at the age of 21, and proceeded to the M.D. three years later. In 1930 he took the M.R.C.P. After graduation he held appointments at the General Hospital and at the Children's Hospital, Birmingham, and later at the London Hospital. He then held a resident post at The Hospital for Sick Children, Great Ormond Street, for about two years. In 1929 he settled in practice at St. Albans, attracted there chiefly because there were children's beds at St. Albans City Hospital (then known as Osterhills), of which he had full clinical charge for ten years. As a medical officer in the Territorial Army attached to the Honourable Artillery Company, Dr. Jameson was mobilized a few days before the outbreak of war in 1939. He had a distinguished Army career as a medical specialist and served in India, Iran, and Ceylon. He attained the rank of lieutenant-colonel and was officer in charge of a medical division of Indian and British hospitals and consultant to a wide area. After the war he returned to his practice at St. Albans for a period before taking up the appointment of consultant on the medical staff of the St. Albans City and Hitchin group of hospitals. Although his early interest in the welfare of children never waned, his new work brought him more into contact with elderly people, and the state in which he found many of them greatly depressed him and he devoted much time to their care. He was a foundation member of the Medical Society for the Care of the Elderly, of which he was secretary for the past year. He also took an active interest in the voluntary nursing service of the British Red Cross Society as lecturer and examiner, and was medical officer to a Hertfordshire detachment. For five years he was deputy coroner for the St. Albans and Barnet areas. He was chairman of the Mid Herts Division of the British Medical Association from 1948 to 1952. His contributions to the medical literature included articles published in the *Archives of Disease in Childhood* and other journals. An enthusiastic sportsman, Dr. Jameson was a keen and expert horseman, and he supported the Aldenham Harriers and the Hertfordshire Hunts for over 20 years. He was medical officer to point-to-point races at Friars Wash, having himself raced before the war. Rock-climbing and mountaineering, too, held a fascination for him, and only a few days before his death he had been rock-climbing with one of his sons. He was also a keen tennis player. In 1932 he married Joan Isabel Colthurst, and she survives him, together with the daughter and two sons of the marriage.

A. P. R. writes: Dr. Jameson's sudden and untimely death was a considerable shock and distress to his many friends in Hertfordshire, a county which he both loved and served well. Equally it has been a very considerable distress to his colleagues. He was essentially a quiet man, loving deeply his family and his gentle and peaceable pursuits. It is indeed a grief to his friends that a man who so tenderly cared for the plight of the old and sick should so early be taken from us. The problem of the old is one of the major issues we have to face in general practice to-day. Many of us are aware of it now: Jameson saw it earlier. In particular, I would remember, in common with many, his true kindliness to younger colleagues, and the good will and unfailing hospitality he and Mrs. Jameson showed them. Even in this material age I am quite confident that there are many people, young and not so young, who will remember him with real affection.

By the death of Dr. H. G. CARLISLE on April 7, at the age of 76, Merseyside has lost a much-respected medical practitioner. Only two weeks before his death he was elected a life member of the Liverpool Medical Institution. Henry George Carlisle was born at Liverpool on November 12, 1877, but spent his early life in Edinburgh, where in due course he entered the university as a medical student. He graduated M.B., Ch.B. in 1899 and proceeded to the M.D., with honours, five years later. After graduation he held the appointment of assistant demonstrator in anatomy and physiology in Edinburgh University and later became house-surgeon at Chester General Infirmary. When he returned to Liverpool at the turn of the century it was with the intention of specializing in orthopaedic surgery, but the death of his father left him with the responsibility of supporting his brothers and sisters, so he entered an old-established general practice at Heswall. He still maintained a strong interest in orthopaedic work, however, and assisted the late Sir Robert Jones at his Liverpool clinic and in founding the Heswall branch of the Royal Liverpool Children's Hospital. During the first world war Dr. Carlisle served as a captain in the R.A.M.C. In 1916 he and the late Professor H. D. Dakin, F.R.S., who died two years ago, presented a report to the Medical Research Committee (now the Medical Research Council) on the use of sodium hypochlorite prepared by the electrolysis of sea-water for disinfectant and antiseptic purposes on shipboard, especially in hospital ships. During the last war Dr. Carlisle carried on the general practice alone while his five partners were away in the Services. A member of the British Medical Association for over forty years, he was chairman of the Birkenhead and Wirral Division in 1943–4. He is survived by a widow, one son, who is also a doctor, and three daughters.

K. W. M. writes: Dr. H. G. Carlisle, who died on April 7 after a few hours' acute illness, was in practice in the Wirral for some fifty years in association with partners in Neston and Parkgate. So eminently was he a doctor at heart throughout all these years that it is impossible to imagine him in any other profession. To say that he easily won the

confidence of his patients is to say only half the truth; he was their friend, and there can have been few of them who did not give him their affection in return. Outside his general practice he was on the staff of the Heswall Hospital for Children from the time it was founded by Sir Robert Jones, whose close friend he became. For about forty years he was the local medical officer of this hospital, visiting regularly and on call day and night; it is not therefore surprising that his knowledge of the orthopaedic treatment of children in all its detail was notable. After the first world war he had charge of many crippled pensioners, and from this experience he contributed an article on war fractures to the *Manual of Orthopaedics* edited by Sir Robert Jones. He was an expert fisherman and some of the salmon he landed were the season's records, but the chief recreation which helped him to live a life which always had the air of enthusiasm was his garden. His wife and he designed and made a famous rock garden, and there persuaded many rare plants to grow which were the envy and despair of other gardeners. In his work, and above all in his home, he spent a life that seemed to his friends always as happy as it was full.

The sudden death of Dr. CHARLES BEWICK on April 10 at the age of 48 came as a great shock to his many friends, colleagues, and patients. He had been in general practice in Durham since the end of the war, and had only recently built himself a house and moved to an expanding suburb at Framwellgate Moor. Born on December 21, 1905, William Charles Dickerr Bewick was educated at the University of Durham. Originally a science graduate—he took the B.Sc. with honours in physiology—he spent two years in America and then returned home to take his medical degrees at Newcastle-upon-Tyne in 1931. Before the war he was in practice for eight years at Welshpool, in Montgomeryshire. Like that of many others, his career was seriously interrupted by war service. He joined the R.A.F. in 1941 and spent three years in the Middle East. Of a shy, retiring nature, he did not seek the limelight, but he lived up to the best traditions of a family doctor. His one absorbing interest was medicine, and it always puzzled his friends how he found time in the midst of a very busy life for all the reading that he did. His early training in physiology and biology equipped him to grasp the complexities of modern scientific medicine.

J. R. McD. writes: The death of Dr. Charles Bewick has brought to a close in the prime of life a career that was an ornament to our profession. A student all his days, he was most conscientious and patient in his work, keeping careful records and following up those avenues where his interests lay. His chief recreations were mountaineering and painting. He had some of his works accepted at local exhibitions. As a man he exuded vigour and energy. Often he would spend a day climbing hills in the Lake District; the journey of over a hundred miles there and back seemed nothing to him. One cannot write of Charles without mentioning Helen, his wife and perfect helpmeet: for her and their children, one son and two daughters, the deepest sympathy is felt in their tragic loss.

Dr. H. E. THORN writes: The death of Dr. H. LINCOLN HATCH, whose obituary was printed in the *Journal* of February 13 (p. 400), is a great loss to general practice. I first met him when I came to Harrow thirty-five years ago. He was well established in Pinner and showed good fellowship to a newcomer. I found at once that he was one of the most active members of the local Division of the British Medical Association and well liked by all his colleagues. He maintained the old-established family adviser attitude as a practitioner and was duly appreciated by all his patients. He also did a good deal of refraction work. His views on current problems discussed at B.M.A. meetings were always well expressed and, although extremely moderate, tenaciously held. He was a man who lived for his patients, and his memory should be an example to the younger generation in medicine.

Medico-Legal

FOSTER CHILDREN

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

It was recently contended in an action before Mr. Justice Lloyd-Jacob in the Chancery Division that children at a boarding school for backward children were "foster children" within the meaning of s. 206 of the Public Health Act, 1936.[1] That section provides that a person who undertakes for reward the nursing and maintenance of a child under the age of 9 apart from his parents or having no parents should give notice of the fact to the welfare authority, and such children are called foster children.

The judge held that children away at boarding school were not properly to be regarded as "apart from their parents." The words involved an intention by the parents to part with the child, together with an intention to deny the child parental guidance and control or inability to provide it.

Most fee-paying pupils at boarding school had homes and parents, and went home for the holidays and could be visited at the school or removed from it by their parents. No distinction could be drawn between pupils whose fees were paid by their parents and pupils whose fees were paid by the local authority: in paying the fees the local authority did so as *alter ego* of the parents, and parental guidance and control could be regarded as susceptible of delegation to the local authority. None of these children could therefore be properly regarded as being "apart from their parents," and they were therefore not foster children within the meaning of the Act of 1936.

DEATH AFTER ANTICOAGULANT THERAPY

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

In May, 1953, Dr. J. L. Macaulay, a ship surgeon aged 66, had a cerebral thrombosis while on a voyage to the United States; it resulted in complete hemiplegia and affected his speech. He was flown home and ultimately went to live with his son in Kensington. He received no special treatment until he was seen in December, 1953, by Dr. T. C. Porter, who decided on anticoagulant treatment as a prophylactic measure.

Dr. Porter advised Dr. Macaulay to go to hospital, but he refused to do so. "Marcoumar," which Dr. Porter had found successful in a previous case, was the drug used, there being no contraindications. Treatment was started on December 18 with a dose of one tablet per day by mouth, and was not controlled by regular prothrombin estimations, which could be done only in hospital. It was carried on until January 22, 1954, when Dr. Porter was told that on the previous day Dr. Macaulay had had bleeding per rectum, and he treated him. The next day, after acute haemorrhage and vomiting, Dr. Macaulay was admitted to St. Stephen's Hospital, Chelsea. On admission he was unconscious, pulseless, exsanguinated, and suffering from shock. He died a quarter of an hour later after a massive haematemesis.

At the inquest before Dr. H. Neville Stafford at the Hammersmith Coroner's Court Dr. Margaret Briggs, medical adviser to Roche Products Ltd., gave evidence that marcoumar, although well known on the Continent, had been used in the United Kingdom only since November, 1953, and not very widely. It was especially useful in controlling thrombosis, and there was no agreement among doctors whether regular prothrombin estimations were necessary in controlling dosage.

The verdict was recorded that death was due to haemorrhage into the small intestine following anticoagulant therapy.

[1] *The Times*, April 14.

Vital Statistics

Births and Deaths in First Quarter

Provisional figures for England and Wales show that this year for the first time since 1947 the number of births registered in the March quarter is greater than the number registered in the corresponding quarter of the previous year. Live births registered numbered 173,784, representing a rate of 16.0 per 1,000 population. Comparable figures for the first quarters of 1953 and 1952 were 171,705 (rate 15.8) and 173,338 (rate 15.9).

There were 153,116 deaths registered, representing a rate of 14.1 per 1,000 population, compared with a rate of 15.8 in the first quarter of 1953 (when influenza was widely prevalent) and 13.5 in the first quarter of 1952. Deaths of children under 1 year of age numbered 5,239, giving a record low rate for a March quarter of 31.0 per 1,000 related live births, compared with a rate of 33.8 in the corresponding quarter of 1953. In the first quarter of 1938 the corresponding figure rate was 69.3. There were 4,220 stillbirths, giving a rate of 23.7 per 1,000 total live and stillbirths, compared with a rate of 22.5 in the corresponding quarter of 1953. The rate for the first quarter of 1938 was 38.3.—*Registrar-General's Weekly Return* No. 15.

Week Ending April 17

The notifications of infectious diseases in England and Wales during the week included pneumonia 451, scarlet fever 994, whooping-cough 1,980, diphtheria 14, measles 1,912, dysentery 919, acute poliomyelitis 17, paratyphoid fever 5, and typhoid fever 1.

Infectious Diseases

The incidence of infectious diseases in England and Wales during the week ending April 10 declined. The largest falls in the number of notifications were 100 for scarlet fever, from 1,474 to 1,374, 88 for dysentery, from 1,642 to 1,554, 84 for whooping-cough, from 2,546 to 2,462, and 37 for measles, from 2,330 to 2,293.

Only small fluctuations were reported in the local incidence of scarlet fever. The largest variation in the returns for whooping-cough was an increase of 57 in Yorkshire West Riding, from 202 to 259. The largest falls in the local incidence of measles were 87 in Norfolk, from 433 to 346, and 86 in Cumberland, from 149 to 63, and the largest rises were 126 in Staffordshire, from 208 to 334, and 70 in Lancashire, from 429 to 499. 12 cases of diphtheria were notified, being 10 fewer than in the preceding week. The chief feature of the returns of diphtheria was a fall in Lancashire from 6 to 3.

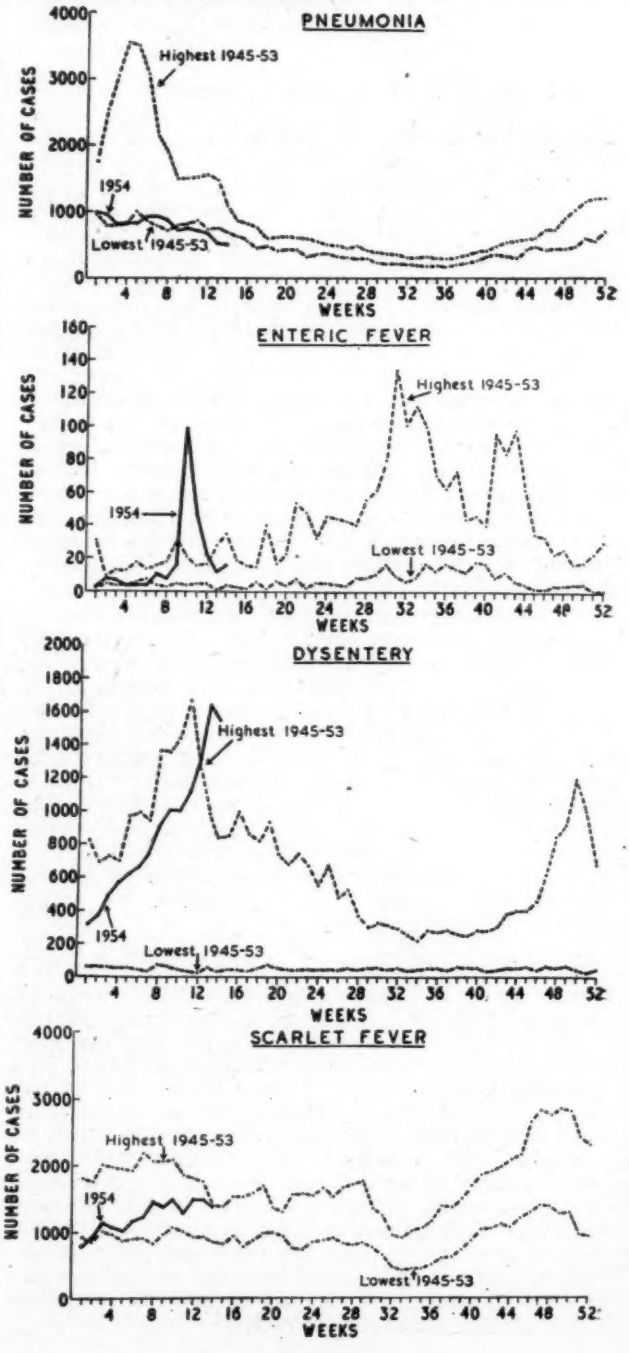
Only 10 cases of acute poliomyelitis were notified. This was the smallest total for five years. The notifications were 7 fewer for paralytic and 4 fewer for non-paralytic cases than in the preceding week. Two cases were notified in the counties of Cheshire, Lancashire, and Yorkshire West Riding.

The largest centres of dysentery were Yorkshire West Riding 236 (Sheffield C.B. 42, Bradford C.B. 36, Brighouse M.B. 27, Keighley M.B. 21, Leeds C.B. 19, Hebden Royd U.D. 18, Wortley R.D. 11), London 230 (Islington 67, Chelsea 43, Lewisham 28, Shoreditch 20, Hackney 11, the other 61 cases were scattered through 18 boroughs), Lancashire 199 (Salford C.B. 22, Urmston U.D. 22, Bolton C.B. 18, Southport C.B. 15, Eccles M.B. 15, Manchester C.B. 14, Liverpool C.B. 13, Leyland U.D. 13), Leicestershire 121 (Leicester C.B. 118), Surrey 85 (Epsom and Ewell M.B. 30, Reigate M.B. 20, Bagshot R.D. 11, Croydon C.B. 10), Middlesex 85 (Edmonton M.B. 32, Hornsey M.B. 13, Willesden M.B. 10), Devonshire 53 (Exeter C.B. 45), Warwickshire 52 (Birmingham C.B. 44), Cheshire 48 (Ellesmere Port U.D. 42), Essex 46 (West Ham C.B. 15), Kent 37 (Chatham M.B. 14), Oxfordshire 35 (Oxford C.B. 35), Norfolk 35 (Norwich C.B. 34), Berkshire 33 (Maidenhead M.B. 27), Nottinghamshire 30 (Nottingham C.B. 24), Staffordshire 28 (Cannock U.D. 19), Lincolnshire 22 (Lincoln C.B. 9), Bedfordshire 20 (Luton M.B. 19), Gloucestershire 20 (Bristol C.B. 11), and Northumberland 20 (Hexham U.D. 15).

In Scotland the number of notifications of dysentery declined from 438 to 399. The largest returns were 211 in Glasgow, 100 in Lanark county, 22 in Edinburgh, and 15 in Dundee.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1945–53 are shown thus - - - - - - -, the figures for 1954 thus ———. Except for the curves showing notifications in 1954, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **April 10** (No. 14) and corresponding week 1953.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	12	0	3	0	0	19	0	9	0	
Dysentery	1,554	230	399	3	6	325	45	81	8	
Encephalitis, acute	7	0	0	0		5	0	0	0	
Enteric fever:										
Typhoid	6	2	0	0	0	2	1	0	0	
Paratyphoid	10	0	4	0	0	9	2	2(B)	0	
Food-poisoning	107	16		1		65	7		0	
Infective enteritis or diarrhoea under 2 years				13	19				23	22
Measles*	2,293	67	175	61	420	23,388	1032	280	209	255
Meningococcal infection	43	3	12	3	3	60	3	17	2	4
Ophthalmia neonatorum	36	4	7	1		40	1	11	0	
Pneumonia†	516	29	220	4	1	925	51	302	15	6
Poliomyelitis, acute:										
Paralytic	7	0	0	0	1	28	6	0	0	2
Non-paralytic	3	0				10	0			
Puerperal fever§	272	26	10	2		265	32	16	1	
Scarlet fever	1,374	76	157	35	43	1,266	69	171	36	52
Tuberculosis:										
Respiratory	787	80	110	39				155	29	
Non-respiratory	112	10	20	5				31	4	
Whooping-cough	2,462	102	432	46	23	2,618	178	288	22	95

DEATHS in Great Towns	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	0	0	0	0		0
Dysentery	0	0		0		0	0			
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		1	0	0		
Infective enteritis or diarrhoea under 2 years	5	1	1	0	1	6	2	3	3	0
Influenza	12	0	1	3	1	44	5	2	2	2
Measles			0	0	1		0	1		0
Meningococcal infection		0	0				0	2		
Pneumonia	203	22	27	9	8	260	38	28	16	8
Poliomyelitis, acute	0	0			0	3	1			0
Scarlet fever		0	0	0	0		0	0		0
Tuberculosis:										
Respiratory	96	12	12	0	8	100	17	26	2	7
Non-respiratory			3	0	1		3	4	1	2
Whooping-cough	3	0	1	0	0	8	1	0	0	0
Deaths 0–1 year	232	22	29	7	15	270	25	30	15	12
Deaths (excluding stillbirths)	5,517	758	669	127	186	5,654	784	681	136	176
LIVE BIRTHS	7,663	1188	930	219	406	8,298	1227	1050	233	410
STILLBIRTHS	211	28	23			219	33	24		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

Rockefeller Grants.—During the first quarter of this year the Rockefeller Foundation disbursed nearly one and a half million dollars in grants. As usual, much of this money went to support medical projects. By a grant of $125,000 to the Medical Research Council, the continuance of the Rockefeller travelling fellowships in medicine is assured until 1959. Biophysics is generously supported by a grant of £$24,000 to London University for the purchase of an additional electron microscope for Professor J. T. Randall, F.R.S., and his colleagues at King's College, London, while Professor T. Caspersson at the Karolinska Institutet, Stockholm, receives $30,000 for his studies of the effects of radiation on the cell. Perhaps of outstanding interest among the other medical projects receiving support are the study of the working of the Health Insurance Plan of Greater New York, and the central register of the Institute of Human Genetics at Geneva. Founded in 1950 with the help of a Rockefeller grant, the Institute has developed a central register for recording hereditary diseases by the medical profession in Switzerland, and it is hoped that the register will contribute to a better definition of the role of heredity in disease. A grant of $12,000 has been given to University College, Dublin, to support Professor E. J. Conway's researches on the behaviour of tissue electrolytes. Recipients of individual grants, mostly for travel in America, include Professor H. J. Eysenck (Institute of Psychiatry, London), Miss Margaret B. Swann (Department of Psychological Medicine, Glasgow), Dr. J. R. Ellis (London Hospital Medical College), Professor F. W. Rogers Brambell (University College of North Wales), Dr. F. P. Glees (Department of Physiology, Oxford), and Dr. James Walker (Department of Obstetrics, Aberdeen).

European League for Mental Hygiene.—Under the presidency of Dr. Doris Odlum, the European League for Mental Hygiene held a conference in Rome last month. The hosts were the Italian League for Mental Hygiene, and the meetings were held at the Institute of Research associated with the University Medical School. In her presidential address Dr. Odlum defined the field of mental hygiene as twofold. On the one hand the treatment of those with mental disorder or arrested mental development and the education of the public about mental health; on the other the prevention of mental ill-health by attention to problems of human relations and development. The British delegation to the conference included Dr. Isobel Wilson, Dr. J. R. Rees, and Dr. E. Stengel.

Danish Medical Bulletin.—In its official organ, *Ugeskrift for Læger*, the Danish Medical Association has for many years published short English summaries of its original articles. Now it has gone a step further by the publication of *The Danish Medical Bulletin*, entirely in English, which is issued as a monthly supplement to the weekly *Ugeskrift*. The *Bulletin*, whose first number accompanies the April 8 *Ugeskrift*, is sponsored not only by the Danish Medical Association but also by the Danish Government through the Universities of Copenhagen and Aarhus and the National Health Service. Subscribers to *Ugeskrift* will receive the *Bulletin* free. Hitherto the *Index Medicus Danicus*, a bibliography of Danish medical papers, has been published by the University Library of Copenhagen. It will now be incorporated in the *Bulletin*, two of whose monthly issues will be devoted entirely to the *Index* so that it can be bound separately. The other issues of the *Bulletin* are expected to contain about 350 pages every year. In addition to original articles there will be short communications, annotations, and notices.

Mitchiner and Lady Cade Medals.—The first awards of of these medals for outstanding services to military and aviation medicine respectively were made by the Council of the Royal College of Surgeons on April 8. Brevet Colonel H. D. Chalke received the Mitchiner Medal for his outstanding

service over many years in improving the health of the Army, and Squadron Leader R. R. L. Pryer the Lady Cade Medal for meritorious service, and in particular for demonstrating that intra-arterial transfusion is readily practicable under Service conditions. These medals will be awarded annually.

Standards for Hospital Equipment.—The British Standards Institution has issued a Sectional List of British Standards for Hospital Equipment (P.D. 1821, March, 1954). It includes details of standards of medical and surgical apparatus, laboratory glassware and scientific apparatus, furniture and fittings, textiles and clothing, photographic and radiological material, testing materials, and electrical equipment. Copies may be obtained from the B.S.I., 2, Park Lane, London, W.1.

May "Family Doctor."—A 1s. 6d. pamphlet on "Slimming the Safe Way" (by Dr. Alan Porter) is given away with this month's *Family Doctor*. In the medical section, Sir Heneage Ogilvie writes about chest surgery and what it can achieve. Dr. T. Traherne explains the electroencephalogram, and Dr. Grey Walter contributes a note about children's "brain waves." Dr. T. Anderson gives plain advice on how long the infectious diseases stay infectious. The Birmingham City Analyst, Mr. H. H. Bagnall, is made the subject of an informative "profile." Professor Alvarez continues to tell us how to live with our blood pressure. No doctor can afford to skip the "Expert Advice" columns, where questions on such subjects as "drugs and mother's milk" and "inherited allergy" are answered.

Change of Address.—The Metropolitan Ear, Nose, and Throat Hospital has now moved to St. Mary Abbots Hospital. Its new address is: Metropolitan Ear, Nose, and Throat Hospital, at St. Mary Abbots Hospital, Marloes Road, Kensington, London, W.8. (Telephone: WEStern 8201.)

Sir John McNee, lately Regius Professor of the Practice of Medicine at Glasgow, and **Professor J. H. Dible,** Professor of Pathology at the Postgraduate Medical School of London, are to receive the honorary degree of LL.D. at a ceremony at Glasgow University on June 16. Both graduated in medicine at Glasgow.

Dr. V. F. Hall, Dean of King's College Hospital Medical School since 1951, has been appointed a Fellow of King's College.

Dr. Dennis Geffen, M.O.H. of St. Pancras and Hampstead, is going to Greece, Cyprus, and Turkey to lecture on poliomyelitis and public health. His tour is sponsored by the British Council and the Cyprus Government.

COMING EVENTS

The Midland Tuberculosis Society and the North-western Tuberculosis Society will hold a joint meeting at the Cheshire Joint Sanatorium, Market Drayton, on May 8. The subjects to be discussed are "What is the Place, if any, of Mass Radiography?" and "An Analysis of the Place of Artificial Pneumothorax in the Treatment of Pulmonary Tuberculosis." Further particulars may be obtained from Dr. G. R. W. N. Luntz, Romsley Hill Sanatorium, Halesowen, near Birmingham.

Ciba Foundation Lecture.—The sixth annual lecture will be given by Sir Macfarlane Burnet, F.R.S., on May 11 at 5 p.m. in the lecture hall, Royal Society of Tropical Medicine and Hygiene, 26, Portland Place, London, W.1. His subject is "The Problem of Virulence in Virus Disease." Admission is by ticket only, obtainable free from the assistant secretary, Ciba Foundation, 41, Portland Place, London, W.1.

Dr. Evarts A. Graham will deliver the second Sir John Fraser Memorial Lecture on May 11 at 5 p.m. in the Surgery Lecture Theatre, University New Buildings, Teviot Row, Edinburgh. His subject will be "Cancer of the Lung, with Special Emphasis on the Aetiology."

French Cancer Film.—A French documentary film on cancer will be shown by the Institut Français du Royaume Uni and the Scientific Office of the French Embassy on May 12 at 8 p.m. at the Institut Français, 15, Queensberry Place, London, S.W.7. The film was prepared for the general public as part of the French anti-cancer campaign. Admission is by invitation, to be obtained in advance from the Scientific Office, French Embassy, 22, Wilton Crescent, London, S.W.1 (Telephone: SLOane 0797, Ext. 5).

Dr. Alfred Blalock, of the Johns Hopkins Hospital, Baltimore, will deliver the Moynihan Lecture in the Riley Smith Hall of the University Union of Leeds on May 14 at 3.30 p.m. His subject will be "The Expanding Scope of Cardiovascular Surgery."

Fourth Varrier-Jones Memorial Lecture.—Professor Harold G. Trimble, of Stanford University, California, will deliver a lecture on "Current Therapy in Pulmonary Tuberculosis" at Manson House, 26, Portland Place, London, W.1, on May 14 at 5 p.m.

Provincial Medical Exhibition.—A medical exhibition on similar lines to that held in London will be held at Victoria Rooms, Bristol University, from May 17 to 21. Further information may be obtained from the organizers, London Medical Exhibition, 194–200, Bishopsgate, London, E.C.2.

Professor H. F. Humphreys will deliver the Webb-Johnson Lecture at the Royal College of Surgeons of England on May 21 at 5 p.m. His subject will be "The Value of the Teeth as Evidence—Scientific, Clinical, and Forensic."

NEW ISSUES

British Journal of Ophthalmology.—The next issue (Vol. 38, No. 5) is now available. The contents include:

EFFECTS OF AREA AND INTENSITY ON SIZE AND SHAPE OF THE ELECTRORETINOGRAM. EXCLUSION OF STRAY LIGHT EFFECTS. A. Wirth and B. Zetterström.
SLIT-LAMP STUDIES ON THE FLOW OF AQUEOUS HUMOUR. T. H. Hodgson and R. K. MacDonald.
OCULAR DISEASE DUE TO BRUCELLOSIS. K. Dean Foggitt.
EQUATORIAL CATARACT AFTER CORNEO-SCLERAL TREPHINING. H. E. Hobbs and Redmond Smith.
PRIMARY TUMOURS OF THE OPTIC NERVE IN VON RECKLINGHAUSEN'S DISEASE. W. A. Manschot.
EVALUATION OF THE WATER-DRINKING TEST. Wolfgang Leydhecker.
DEGENERATIONS OF THE DOG RETINA. IV. RETINOPATHIES ASSOCIATED WITH DOG DISTEMPER-COMPLEX VIRUS INFECTIONS. H. B. Parry.
INTRANASAL RHINO-DACRYO-CYSTOSTOMY FOR PERSISTENT EPIPHORA IN CHILDHOOD. H. S. Sharp.
CHOROIDAL CARCINOMA METASTATIC FROM THE MALE BREAST. C. H. Greer.
LAMELLAR KERATOPLASTY FOLLOWED BY CATARACT EXTRACTION IN MALIGNANT PAPILLOMA OF THE LIMBUS. P. Sivasubramaniam and T. Hoole.

Issued monthly; annual subscription £4 4s.; single copy 8s. 6d., obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

Archives of Disease in Childhood.—The April issue (Vol. 29, No. 144) is now available. The contents include:

THE ANAEMIA OF PREMATURITY. B. L. Coles and Ursula James.
CONGENITAL ECTROPION OF THE UPPER LIDS. Robert J. Young.
CONGENITAL STRIDOR CAUSED BY AN ABERRANT PULMONARY ARTERY. T. M. Welsh and I. B. Munro.
THE RESPONSE OF INFANTS TO A LARGE DOSE OF WATER. R. A. McCance, N. J. B. Naylor, and E. M. Widdowson.
THE SERUM PROTEIN LEVELS OF NEWBORN AFRICAN INFANTS. M. W. Stanier and M. D. Thompson.
SOME DIFFERENTIAL CHARACTERISTICS OF CEREBRAL MOTOR DEFECTS IN INFANCY. Eirene Collis.
DIFFERENTIAL DIAGNOSIS OF FACIAL AND DENTAL MANIFESTATIONS IN CONGENITAL SYPHILIS. G. O. Horne.
HONEYCOMB LUNG AND XANTHOMATOSIS. A. M. MacDonald and Robert A. Shanks.
FEMALE PSEUDOHERMAPHRODITISM WITH ADRENOCORTICAL FAILURE IN IDENTICAL TWINS. Sulammith Wolff.
EPILOIA AND ENDOCARDIAL FIBRO-ELASTOSIS. L. Crome.
BACTERIAL ENDOCARDITIS COMPLICATING SEPTICAEMIA IN AN INFANT. Ian C. Lewis.
THE AGE OF CHILDREN WHEN GROWTH IN STATURE CEASES. E. M. B. Clements.
TWO CASES OF PRIMARY TUBERCULOSIS AFTER IMMERSION IN SEWAGE CONTAMINATED WATER. F. J. W. Miller and J. P. Anderson.
TWELVE CASES OF LYMPHOBLASTOMATA IN CHILDREN. George M. Maxwell.
SCROTAL GANGRENE IN A NEWBORN BABY. Nicholas Alders.
NEONATAL THROMBOCYTOPENIC PURPURA IN TWO INFANTS. M. L. Neville and L. M. Masterman.

Published six times a year; annual subscription £3 3s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Applications should be made first to the institution concerned.

Friday, April 30

CAMBRIDGE MEDICAL SOCIETY.—At Addenbrooke's Hospital, 3 p.m., Dr. L. B. Cole: Hexamethonium in the Treatment of Hypertension.

Monday, May 3

INSTITUTE OF CARDIOLOGY.—9.30 a.m., Dr. K. W. Donald: Exercise in Heart Disease.

INSTITUTE OF CHILD HEALTH.—5 p.m., Professor G. Frontali (Rome): Proteins in Child Nutrition.

INSTITUTE OF NEUROLOGY.—5 p.m., Professor Klaus Conrad (Homburg-Saar): New Problems of Aphasia.

INSTITUTE OF PSYCHIATRY.—5.30 p.m., lecture-demonstration by Dr. E. Stengel.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. E. S. Clarke: Cervical Spondylosis with Cord Compression.

Tuesday, May 4

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. E. J. Moynahan: Urticaria.

INSTITUTE OF NEUROLOGY.—5 p.m., Dr. I. Wickbom (Gothenburg): Choice of Encephalography or Ventriculography for the Examination of Intracranial Tumours (with special reference to Posterior Fossa and Basal Tumours).

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—5 p.m., Croonian Lecture by Dr. J. F. Smith: Nutrition and Child Health.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Arnott Demonstration by Professor M. F. Lucas Keene: Development of the Pharynx.

ROYAL MICROSCOPICAL SOCIETY.—11 a.m. to 1 p.m.; 2.30 to 4.30 p.m.; 6 to 7.30 p.m., symposium on the Golgi Apparatus.

WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY.—5 p.m., Almroth Wright Lecture by Sir Wilfred Fish: Dental Research in the Inoculation Department.

Wednesday, May 5

EDINBURGH UNIVERSITY: FACULTY OF MEDICINE.—At Surgery Lecture Theatre, University New Buildings, 5 p.m., Macarthur Postgraduate Lecture by Professor H. K. Beecher (Massachusetts): Resuscitation and Other Early Care of the Severely Wounded Man.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. H. Haber: Lichen Planus and Lichenoid Eruptions.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. M. Bodian: Hirschsprung's Disease and Chronic Constipation in Childhood.

Thursday, May 6

EDINBURGH UNIVERSITY.—At Anatomy Lecture Theatre, University New Buildings, 5 p.m., Cameron Prize Lecture by Professor Gerhard Domagk (Münster): Development of Chemotherapy in Tuberculosis.

INSTITUTE OF CARDIOLOGY.—9.30 a.m., Dr. Maurice Sokolow (California): Some Aspects of Quinidine Therapy.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Arnott Demonstration by Professor G. W. Causey: Sterno-mastoid Muscle; 5.30 p.m., Otolaryngology Lecture by Professor G. A. G. Mitchell: Sympathetic Nervous System in Relation to the Throat, Nose, and Ear.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., neurology demonstration by Dr. D. J. Williams.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.—4.30 p.m., clinical meeting.

●SOCIETY OF CHEMICAL INDUSTRY: MICROBIOLOGY GROUP.—At Microbiological Research Department, Experimental Station, Porton, near Salisbury, Wilts, 11 a.m., papers by Mr. R. Ellsworth and Mr. L. R. P. Meakin, Dr. D. Herbert, and Mr. E. O. Powell.

Friday, May 7

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., clinical demonstration by Dr. M. S. Thomson: Lichen Planus.

LEBANON HOSPITAL FOR MENTAL AND NERVOUS DISORDERS.—At Cora Hotel, Upper Woburn Place, London, W.C., 5 p.m., 55th annual meeting.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Mr. E. T. C. Milligan: Surgery of the Anal Canal and Fistula-in-Ano. 4 p.m., Dr. H. G. Miller: Allergic Disorders of the Nervous System.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Theatre, 5 p.m., Mr. R. A. Brews: Obstetric/Gynaecological Conference.

WHIPPS CROSS HOSPITAL MEDICAL SOCIETY.—8.30 p.m., clinical meeting.

Saturday, May 8

MIDLAND TUBERCULOSIS SOCIETY.—At Cheshire Joint Sanatorium, joint meeting with North-Western Tuberculosis Society.

SOUTH-EAST METROPOLITAN TUBERCULOSIS SOCIETY.—At Preston Hall, near Maidstone, 10.30 for 11 a.m., extraordinary general meeting. Dr. A. Stocker (Illinois, U.S.A.): Preferences in Surgery for Tuberculosis.

WEST MIDLANDS PHYSICIANS ASSOCIATION.—At Royal Salop Infirmary, Shrewsbury, 11 a.m., spring meeting.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Davies.—On April 7, 1954, at the R.N. Hospital, Trincomalee, Ceylon, to Elizabeth (formerly Ross), wife of Surgeon Lieutenant John M. Davies, R.N., a son.

Jacobs.—On April 6, 1954, at the Nottingham Hospital for Women, to Jean, wife of Dr. Brendan Jacobs, a daughter—Stella Jean.

Morgan.—On April 2, 1954, at St. Michael's Hospital, Lethbridge, Alberta, Canada, to Helen (formerly James), S.R.N., S.C.M., M.T.D., wife of John E. Morgan, M.B., B.S., M.R.C.O.G., a sister for Joanna and David—Susan Gail Margaret.

MARRIAGES

Zeitline—Roberts.—On April 2, 1954, at the Paddington Register Office, London, W., L. L. B. Zeitline, M.R.C.S., L.R.C.P., of 16, Norfolk Place, London, W., to Miss Jane Roberts, of 30A, Sussex Place, Hyde Park, London, W.

DEATHS

Badcock.—On April 6, 1954, at Flodden Lodge, Cornhill-on-Tweed, Northumberland, Vincent Edgar Badcock, M.C., M.D.

Burgess.—On April 22, 1954, at 454, Perth Road, Dundee, William Leslie Burgess, C.B.E., M.D., F.R.C.P.Ed., D.P.H., D.T.M.&H., aged 68.

Carlisle.—On April 7, 1954, Henry George Carlisle, M.D., of Ardlair, Heswall, Cheshire.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

The Use of the Toothbrush

Q.—*Is the regular use of the toothbrush really worth while? Does it not damage the gums as much as it saves the teeth? The best teeth I have seen have been in those who have never used a toothbrush.*

A.—The use of the toothbrush is an essential habit for everyone who wishes to have healthy teeth and gums. Brushing the crowns of the teeth removes debris and keeps the surfaces polished, thereby minimizing the risk of decay. Places, such as the interdental spaces, where the bristles cannot reach are always the danger spots for the start of decay. There is good statistical evidence that toothbrushing immediately after meals reduces the incidence of caries.[1]

But just as important is the good, not harm, derived from brushing the gum margin, provided it is done with a soft brush and a rotary motion so that the bristles pass from the gum to the tooth surface. Most individuals eating civilized diets need to use a toothbrush regularly to prevent gum diseases, which are caused by stagnation of food debris and tartar around the teeth. The correct use of a soft toothbrush is an essential part of the treatment of all gum diseases, though damage to the gums and teeth can be produced by the incorrect use of a hard toothbrush.

REFERENCE

[1] Fosdick, L. S. (1950). *J. Amer. dent. Ass.*, **40**, 133.

Sensitivity Tests before Radiological Investigations

Q.—*Is there any real advantage in performing sensitivity tests before intravenous pyelography, bronchography, or cholecystography? If so, what tests are advised?*

A.—It is very doubtful if sensitivity tests for intravenous pyelography, whether intravenous, subcutaneous, oral, or ocular, are of sufficient reliability to warrant their routine use, and they are probably best reserved for cases with a positive indication for their performance. To select these cases, a routine history should be taken from every patient before injection, directed to determine whether there is a history of any allergic phenomena (such as asthma or urticaria); whether there is any known sensitivity to iodine; and whether there has been a previous pyelogram, and if so whether there was any reaction. With this information a decision as to the necessary precautions can be taken, and a suggested scheme is as follows.

If the past history is clear, no special precautions are indicated.

If there is an allergic history, it is known there is an increased incidence of sensitivity reactions (Mullen and Hughes[1]) and the injection should be given very slowly, with a pause of about two minutes after the first 1 ml. Restoratives, such as oxygen, adrenaline, and promethazine hydrochloride (for intramuscular use), should be immediately available. There is a certain amount of evidence (Inman[2]) that, in the presence of a history of allergy, iodoxyl is preferable to diodone.

If there is a history of sensitivity to iodine, or of a mild reaction to previous pyelography, it is as well to postpone the examination until sensitivity tests have been performed. As little as 1 ml. of diodone given intravenously as a test dose has proved fatal (Dotter and Steinberg[3]), so it is advisable to start with 1 ml. of 1/100 solution and proceed at ten-minute intervals to 1 ml. of 1/10 solution, 1 ml. of full-strength solution, and 5 ml. of full-strength solution. If there is no reaction then the full dose can be given.

If there has been a severe reaction to a previous pyelogram, desensitization to the medium should be performed. A suitable course of desensitization is to start with oral doses at three-hourly intervals, beginning with 0.25 ml. and increasing by about 50% each time, and then to proceed to intravenous desensitization (two-hourly injection, starting with 0.5 ml. of full strength and again increasing by approximately 50% with each dose).

In bronchography, consideration must be given to the local analgesic and to the contrast agent. Whichever local analgesic is used, a short-acting barbiturate should first be administered to combat the potential toxic effects on the cerebral cortex. The best local analgesic for bronchography is lignocaine; a sensitivity test is probably not necessary when using this drug. With amethocaine a sensitivity test is, perhaps, advisable (0.1 ml. of 2% amethocaine subcutaneously), although in many centres it is dispensed with. There is no indication for using cocaine in bronchography; if it is used, however, a sensitivity test should certainly be performed (0.2 ml. of 5% cocaine subcutaneously).

Before oral cholecystography sensitivity tests are not indicated.

REFERENCES

1. Mullen, H. N., and Hughes, R. C. (1952). *Amer. J. Roentgenol.*, 68, 903.
2. Inman, O. K. E. (1952). *Brit. J. Radiol.*, 25, 625.
3. Dotter, C. T., and Steinberg, I. (1951). *Angiocardiography*, p. 43. P. B. Hoeber, New York.

T.A.B.T. Vaccine in Children

Q.—*A child of 3 was given a first dose of 0.1 ml. of T.A.B.T. vaccine before going abroad. Two and a half hours later he had a reaction consisting in slight cyanosis, rapid respirations and pulse, and a temperature of 101.8° F. (38.8° C.). In view of this, do you advise a second dose of 0.2 ml. in one month's time, or what alternative do you recommend?*

A.—T.A.B.T. (typhoid-paratyphoid vaccine and tetanus toxoid) was introduced for the immunization of adults and is unsuitable in its present form for young children. The dose injected into this child—that is, 0.1 ml.—contained a reasonable first dose of T.A.B. vaccine, but only one-fifth to one-tenth of the required dose of tetanus toxoid. It would be well to give these prophylactics separately to complete immunization.

Probably the T.A.B. constituent of the combined preparation caused the trouble reported, and not the tetanus toxoid, which is an exceptionally innocuous prophylactic at all ages. The dosage of T.A.B. vaccine for children is arbitrary, but in general young children tolerate injections of vaccines better than adults, and are therefore given larger doses in relation to body weight. Possibly this patient has an allergic personal or family history, or has been sensitized in some way to bacterial protein. Another and more probable explanation is that leakage occurred from the inoculation site into a vein, and caused symptoms which are unlikely to be repeated. It is suggested that further immunization might be attempted with two doses each of 0.1 ml. (or 0.2 ml.) of T.A.B. vaccine, spaced by four weeks. As a safeguard in this child, the injections might be administered in the evening, adrenaline and antihistaminic drugs being kept in readiness to control any allergic symptoms that develop. Care should also be taken to ensure that the route of administration is subcutaneous rather than intramuscular.

Protein and Resistance to Tuberculosis

Q.—*What is the evidence that a diet rich in protein raises resistance to tuberculosis?*

A.—There is experimental evidence that animals fed on diets adequate in protein and subsequently infected with tuberculosis survive longer, and with fewer lesions, than controls on diets poor in protein. In clinical and statistical studies it is often difficult to dissociate nutrition from other social factors, but there is much evidence which suggests its importance. For instance, a world food survey showed an inverse relationship between animal food intake and tuberculosis mortality in European countries. There was a sharp rise in mortality from tuberculosis among French prisoners of war when Red Cross food parcels ceased. In the first world war the rise and fall of tuberculosis mortality in Denmark was closely associated with the supply of meat in the towns. A similar association with intake of first-class protein has been suggested in England and Wales in the second world war. This and much other evidence is reviewed in the chapter entitled "Food and Tuberculosis" in *Causes and Prevention of Tuberculosis*, Brice R. Clarke: E. and S. Livingstone, Edinburgh, 1952; in *Tuberculosis, a Global Study in Social Pathology* (pp. 359–373), John B. McDougall: E. and S. Livingstone, Edinburgh, 1949; and in *The Pathogenesis of Tuberculosis* (pp. 318–325), Arnold R. Rich: Blackwell, 2nd ed., Oxford, 1951.

Spermatorrhoea and Sexual Neurosis

Q.—*What investigations and treatment are advised for a case of spermatorrhoea? At first there was an occasional loss of a drop or two of semen after urination, but now it happens regularly. The patient is worried about his symptoms.*

A.—The drop squeezed out at the end of micturition is more likely to be prostatic than testicular secretion, although it will doubtless contain a certain number of spermatozoa. The genital tract should first be examined and the existence of any such lesion as a prostatitis excluded. The key to the case almost certainly lies in the words: "The patient is worried about his symptoms." He is probably a man with no sexual outlet who has not yet come to terms with his sexuality and who is in process of developing a sexual neurosis. In other words, he is more likely to be in need of psychological than of physical help. The physical symptom complained of is often associated with a sexual neurosis.

Arsenic and Bromide Rashes

Q.—*As students we were taught that a small dose of arsenic prevented bromide rashes. Is this true? Could very small doses of arsenic, such as a few minims of liquor arsenicalis, taken over a long period have any harmful effect?*

A.—The belief at one time widely held that small doses of liquor arsenicalis in a bromide mixture prevented bromide rashes rests upon no scientific basis nor on any controlled clinical trials. In the days when bromide was commonly taken over a prolonged period of time for the control, say, of epilepsy, the liquor arsenicalis usually given with it quite often caused hyperkeratosis and bronzing of the skin.

"Any Questions?" Book.—The second book of selected "Any Questions?" is available, price 7s. 6d. (postage 6d.). Copies may be obtained either direct from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1, or from booksellers.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 4499. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors overseas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 4499. TELEGRAMS: *Britmedads, Westcent, London.*

MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 4499. TELEGRAMS: *Medisecra, Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.